

A
Full DISCOVERY
O. F
B E E S.

• Treating of

The { Nature,
Government,
Generation &
Preservation } of the B E E.

With the Experiments and Improve-
ments, arising from the keeping them
in transparent Boxes, instead of Straw-
hives.

Also proper Directions (to all such as keep Bees) as
well to prevent their robbing in Straw-hives, as
their killing in the Colonies.

The Second EDITION,

By *Moses Rusden*, an Apothecary; Bee-Master to the
King's most excellent Majesty.

*Si quid novestis rectius istis
Candidus, imperti: Si non, his uere mecum*

Published by His Majesties especial Command, and ap-
proved by the Royal Society at Gresham Coll.

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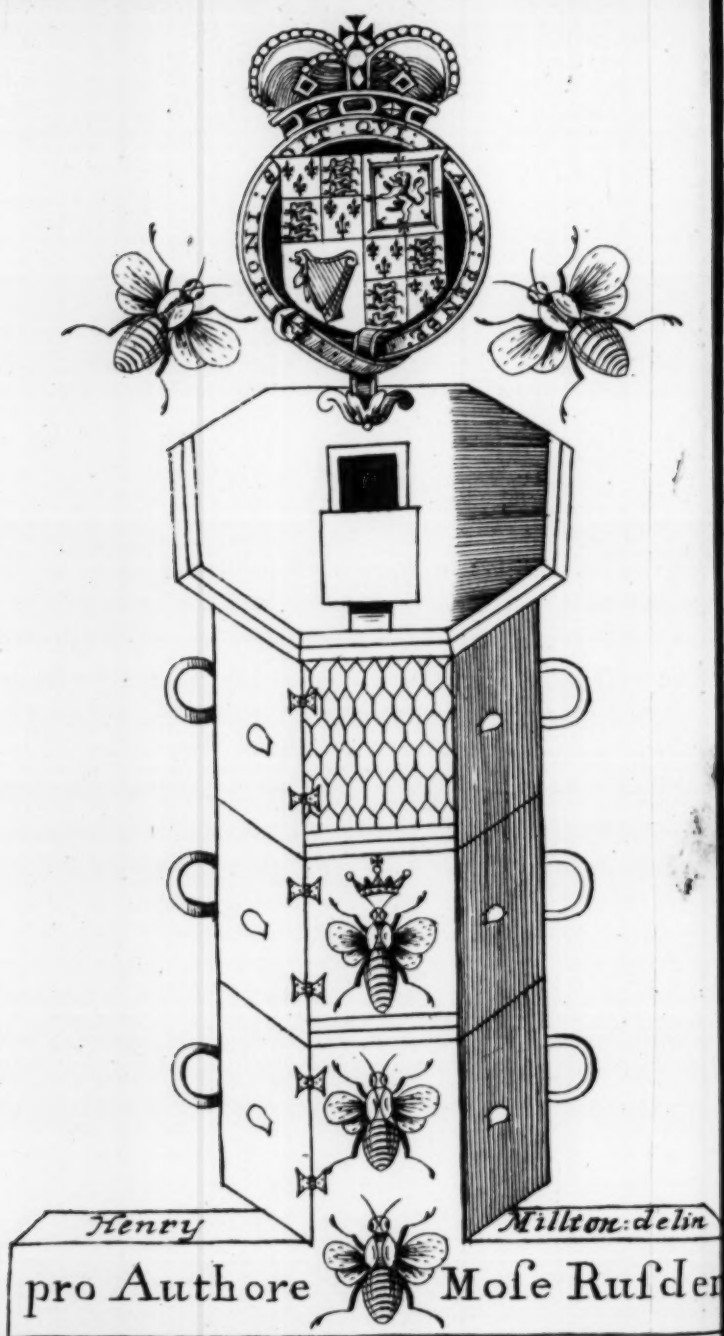
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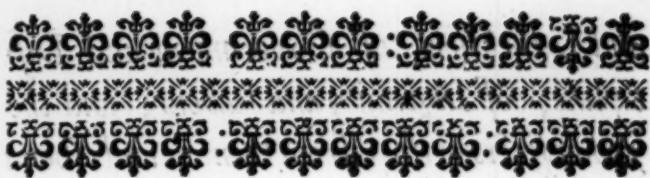
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TO THE
K I N G ' S
MOST
EXCELLENT MAJESTY.

May it please your Majesty.

I Am very conscious that such as presume to make Dedications to your Majesty ought to treat of Subjects lofty and learned, and with a Pen eloquent and subtile. But although the Subject of this small Offering be mean and the Stile be Humble. Yet, it speaks knowingly and by experience, of Kings, and Chieftains; of War, and Peace; of Obedience

and Subjection, of Government and Discipline, of Ingenuity and Labour, and the good effects arising from them: and shews how necessary they are, even in this little well form'd Commonwealth of the Bees; whose Being, and Prosperity depend upon their Prince, and common Parent. Fathers being the first Rulers, Lawgivers and Monarchs, before Families did swell into a larger Kingdom Since therefore Nature will herein be made appear to be the Favourer and Founder of Monarchy; and that such ingenious, laborious and profitable Creatures do voluntarily and constantly betake themselves to that Government, I do most humbly beseech your Majesties gracious Patronage and Protection, whilest I demonstrate and vindicate this Truth, by the perpetual practice of the Bees: Which may haply have some influence upon such as look with a malicious Eye upon Kingly Government, as being the effect of necessity and force, and not
of

of a natural inclination, and of choice ; I
make it my prayer that all your Majesties
Subjects may be as loyal to your Majesty,
as conformable to your laws, and as bene-
ficial to the Publick, as these little People
are to their Sovereign, to their customs,
and their republick, in which they most ex-
emplarily labour and obey. And I hum-
bly implore your Majesty to accept graci-
ously this grain of Incence offered with
much devotion by

Your Majesties

Most Loyal and most Obedient

Subject and Servant

Moses Rusden.

TO

TO THE
ROYAL SOCIETY
AT
Gresham Colledge.

ALthough the lowness of my Condition, and my Fortunes hath not permitted me to prosecute Studies deep or difficult; and that I know my self too well, to affect or aim at the being in the form of Philosophers or Politicians: yet I may perhaps without presumption pretend something to both, though afar off, and at a mannerly distance, without the censure of vanity. Whilest I entertain my self and others with the humblest Subject that can well admit so many and so useful Observations as have from thence arisen to me, and men of the greatest Consideration.

The wise man directs to the Pismire

The Epistle Dedicatory.

mire for instruction ; I have the advantage of proposing a president much more exemplary, and more deserving our imitation ; for, this better inspired Insect, the Bee ; being it self untaught, gives us variety of Lessons not unworthy, in many things, of Princes and of States-men, of good Subjects, and such as would grow rich, and prosper. And, even the most eminent Philosophers, that pry with the most penetrating Eyes and Imaginations into the secrets of Nature, have with much study and amazement contemplated the Bees, whom they have found to be as Busy, Forcible, Curious, and Remarkable as in any of her greater works, which attract more of our admiration, and enquiry, my design is not to dispute peremptorily, with *Aristotle*, *Pliny*, or other my learned Masters, who have elaborately con-

The Epistle Dedicatory.

sidered and discoursed of the nature of Bees, and their faculties ; although I may upon new and plain discoveries sometimes deviate from them. Nor shall I with *Virgil* , describe with Fancy, and fine invention these little people, which are indeed worthy to be celebrated by so excellent a Poet : My business, by the good helps I have had, is to shew Nature, and Truth naked, and unadorn'd, with Metaphors or suppositions ; for I would be considered only as a Traveller who hath carefully, studiously, and faithfully visited and examined other Nations, to bring home to publick use, & information, the observations he hath made, of their living and subsisting, their Laws & Government, their Arts and Manufactures, and the strengths, and pollicies by which they preserve themselves upon all occasions, I have therefore with much sincerity

The Epistle Dedicatory.

cerity laid before you what I have collected from Authors of the highest degree, as well as more modern writers, and what my Eye hath seen, my experience proved, and certain my knowledge can, and hath demonstrated, and will therefore hope that you (who are the greatest Judges I can appeal to, where Art or Nature are concerned) will find reason, upon farther examination, to recommend as things useful, true, or strongly probable at least, the farther Discoveries I have made ; or have brought to a clearer light what hath been more obscurely, or uncertainly guess'd at, or treated on by others, whilst I manifestly shew how Bees may be best understood, enjoied, and preserv'd alive, to the benefit of cruel and ungrateful Mankind, who hitherto, like the worst of Robbers, hath spoyled them at
once

The Epistle Deditory.

once of their lives and treasures. And although they seem indeed but as it were so many Flies playing in the Sun, or among the Flowers of the Field. Yet, if we shall vouchsafe to consider them, as we do our selves making boast of our Reason (which as it is abused by us, is as much our condemnation, as our Prerogative) and of our greater Bulks, and Dominion man hath above these minute Creatures; it may be well confess'd that the Divine Providence hath not in any part of its high and mysterious operations called for our wonder more than in the contrivance, the counsel, and the signal assistance, it imparts to these little Societies of Bees, who as well as the proudest, or the greatest Giants of the Creation may brag that *Est Deus in Nobis*; and who by that Divine and Extraordinary impulsion (with-

out

The Epistle Dedicatory.

out experience, or instructions derived from their short lived Ancestors, whom they could never know) do evidently, and as it were by a well applied Rule, and by an instinct less erroneous than that Reason it self which oftentimes misguides us; and by laws more steady and inviolable than those of the *Medes* and *Persians*, subsist, and govern, with Prudence, Foresight, Courage, Oeconomy, Fidelity, Regard to Interest, and all those Offices and Virtues, which mankind hath at any time arrived to for the preservation of it self, and of Humane Society. And the more to assimilate them to mankind, we shall discern as in an Epitome, the Vices, and the Passions, the Envie, the Robberies, and the Murthers, which the ambitious, the Idle and the Depraved do practice upon the Earth. And, we shall now
find

The Epistle Dedicatory.

find their qualities, and their works, better discovered, and demonstrated, by the transparant Hives first shewed to us by Dr. *Wilkins*, late Bishop of *Chester*, a most Eminent Member of your Society, which have since received several variations and improvements by one *Geddie*, and since by my self, with such informations and instructions, as I have found necessary for the rendering them more practicable, and useful. So that every person may either gather Honey, or pleasant Observations from these intelligent Creatures; who deserve well from all, especially from those who may pretend to Virtue and Knowledge, among whom you are Princes. And I therefore.

Your most devoted.

M. R.

THE
P R E E A C E
TO THE
R E A D E R.

Courteous Reader,

BEES are of such strange natures,
and liable to so many accidents,
that unless a man be very wa-
ry and circumspect, he shall reap
but little profit or advantage by them.
Which is the cause, that there are so ma-
ny proverbs relating to Bees. For as a
man having lost his right way in a Forest
or Wood, meets with many waies or paths,
but seldom hits upon the right; so most of
those who have written any thing now
extant concerning Bees, (not knowing
the right way & manner of their Govern-
ment and Breeding) have run into ma-
ny errors and by paths of ignorance, sel-
dom (yet sometimes) hitting right con-
cerning some things of their nature
in general, which uncertainty in most
writers, hath caused many false prover-
bial

The Preface

bial sayings relating to them, viz. That Bees are lucky to some persons, and will thrive with them; but unlucky to others and will not thrive with them. That they must be bought with Gold, or Corne, or else must be given, or found; otherwise (forsooth) they can by no means be supposed to thrive. And that they are unlucky to be carried by water, and must be removed southward: and many other such like ridiculous stories, not worthy the mentioning. When the true and only reason why Bees thrive not with every man alike, is either the want of judgment or care, or both, in those who look after them; as appeareth by this proverbial instance, that when the owners of the Bees dies, then the Bees also (as if they had a Sympathy with their owners) will die soon after; which I have known, seemingly verified, by some ancient persons who kept Bees, had skill, and looked well after them whilst they lived, but they dying, the greater part of their Bees within one year after have died also, which happened not because the owners died, but because the skill and care of the Bees died with those owners.

The

to the Reader.

The consideration of this great disadvantage to my country; and that Bees may thrive with all those who are ingeniously concerned as to profit and pleasure by them, induced me to publish this treatise, of the Natures, Government, and Generation of Bees, and the right way of ordering them in Colonies; that my countrymen by this discovery may know not only the causes of their Bees miscarrying to their own loss, but also how to prevent, as well the miscarriages of Bees, as the cruelty exercised upon them, by killing them when their Honey is taken away: 'Tis so many accidents attend them, and so much difference is in their strength one Stock from another, and in the soyl neer which they stand, and in the places they stand in, besides the uncertainty of the weather in England; that almost no general rules can be set down for directions, but may in some sort, and at some times and places, admit of some exceptions and small alterations; therefore circumspection must be used, until experience shews you how to order Bees rightly.

The cause of my following this method of keeping Bees in Colonies, at first was
my

The Preface

my love to the Bees themselves, and the hatred of that cruelty exercised on those poor industrious creatures, (so wisely providing for their own future livelyhood,) which is so like the method of the Devil, that paves his most industrious servants with the greatest ruine: And finding by my own experience, though others in some places miscarried, that the causes were their mismanagement, and mistakes, by reason their Box-Hives and their Bee Houses were not made by any pattern, or else by some false pattern, and not through any defect in the Art its self: And also finding my Bees in several countries to thrive very well, and answer my expectations in their profit, something of which I shall mention in the last chapter of this Book, I therefore thought it necessary, and a duty, which I owe to my Country, to discover to all that delight in Bees, those experiences which I have obtained in so delightful and profitable a method.

And in order thereunto, for the encouragement and instruction of all those who shall desire it, I shall be ready whilst I live to impart unto them any directions needful from time to time, when

to the Reader.

when they come or send to me. And if any Person of Quality or Gentleman desire it, I shall be ready to come to their Houses, to assist and direct them in this method of improving Bees.

And I doubt not but with the due observance of the directions this Book will afford, and some small attendance, any man may receive, not only good profit from them, (without the destruction of such industrious servants,) but also much delight and pleasure in beholding from time to time their curious works.

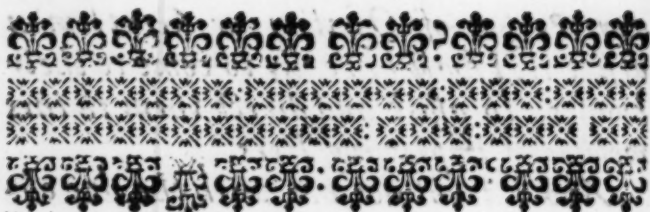
This I thought good to premise to the candid Reader, whose profit and delight is by this Book intended; which if he reap, let him give God the glory, in beholding his wonderful works in these so small and admirable creatures, and pass a favourable interpretation upon the endeavours of,

His Countries hearty well-willer,
Moses Rusden.

From my House; neer the sign of the Kings-
Arms in the Bowling Alley, in Westminster;
neer the Abby, July, the 18th.

[a]

Adver-



Advertisment.

THat his Majesty hath given
and granted by letters pa-
tents under the great Seal
of England, to *John Gedde*, and his part-
ners, the full and sole power, privi-
ledge, and authority, of using, practi-
sing, exercising, and enjoying the
new art and invention for the im-
provement of Bees, during the space
of fourteen years, according to the
statute made in that behalf; barring
and excluding all others whatsoever
from

Advertisment.

from making, using, practising, counterfeiting, imitating, or resembling, the same, without the special licence, and consent of the said *John Gedde* and his partners, first had and obtained, under the penalties in the said statute contained.

All persons that desire to set up this method may be pleased to take notice, that they may be furnished with Box-Hives, and Colonies ready made, instructions, and licences, and the sight of several Bee-Houses, and Colonies improved in this way, by the Author, an Apothecary, at his House in the Bowling-ally aforesaid, who is authorised and empowered by the said *John Gedde*, and his partners, to give forth licences, &c.

And if any Person of Honour or Gentleman shall think amiss of my Assertions in this Book, or any of them,

Advertisement.

them, I offer my self to prove the same, by cleer argument in answer to objections if desired, or by operation, if they will be at the cost.

THE



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of this BOOK.

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*Monarchy founded in Nature,
and proved, by this History
of Bees, &c.*

Section 1.

Of the Natures and Properties of Bees.

CHAP. I.

Of a Colony of Bees.

A Colony of Bees is properly a Swarm coming forth of a Stock; which Stock being full, hath not room to contain those great numbers of Young which are produced in the Spring, and consequently they go forth in a Swarm, and so live by themselves, separate from the Stock, whereby they become another Kingdom.

B

Now

Now the keeping of Bees in Box-hives, I call by the name of Colonies; to distinguish them from those kept only in Straw-hives; because all those young broods which are bred in the Spring, have room made fit for them, by the addition of another Box-hive, whereby they continue their labours without intermission, by working in those additional Box-hives, instead of swarming; so that thereby all the labours of all the Bees, as well young as old, are united in one Colony.

Every Colony, Swarm, or Stock of Bees, consisteth of several Bees, all of one genus, which for distinction may be divided into three several sorts of Bees, *viz.* a King-Bee, a common Honey-Bee, and a Drone-Bee; which may be compared to three sorts of Doggs for their different shapes; thus: the King-Bee to a most stately Buck Gray hound; the common Bee to a little fierce Bull-Dogg; and the Drone-Bee to a great Mastiff-Dogg; of which in their order.

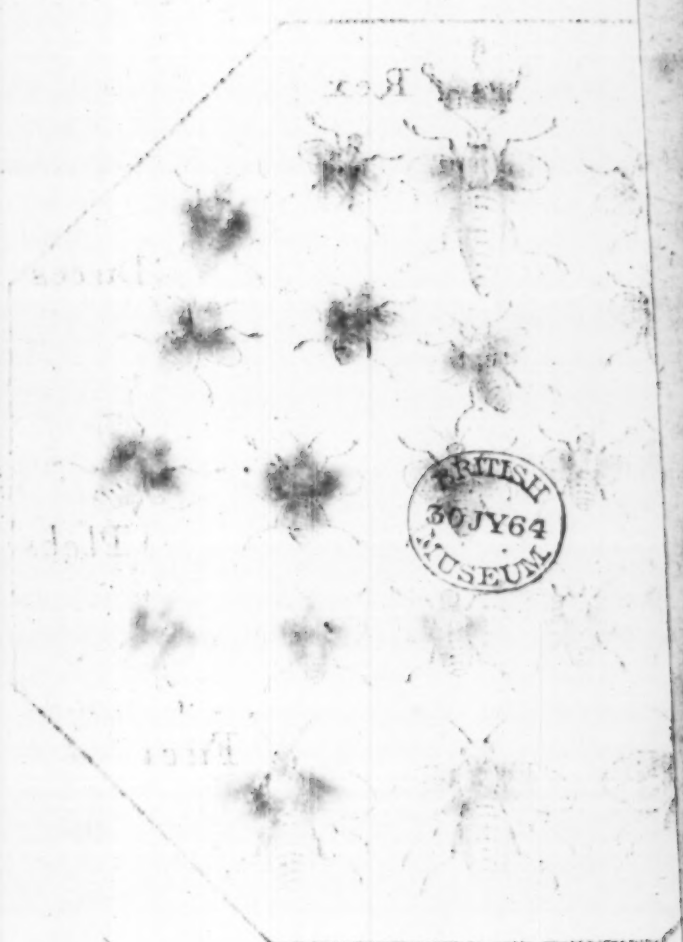
CHAP. II.

Of the King-Bee.

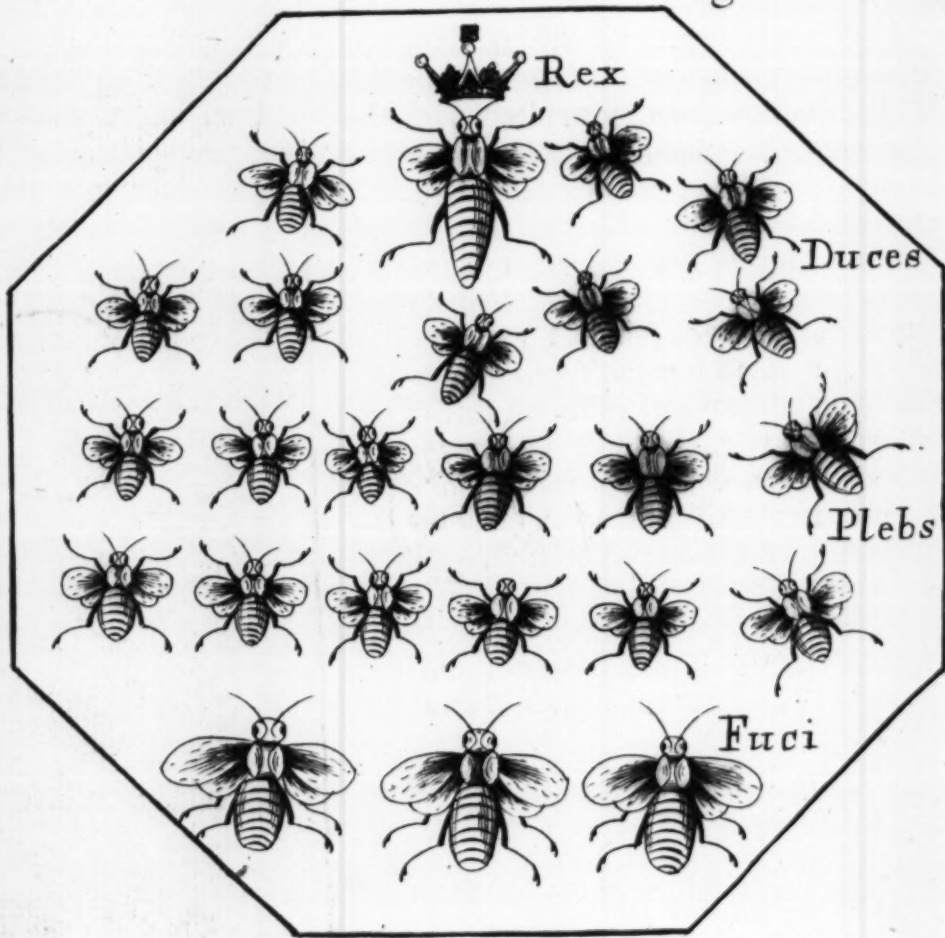
THE Royal Race of King-Bees, being natural Kings; one of them equals the value and worth of all the rest: therefore as the most worthy, I shall here describe the King-

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Sect. I. Properties of Bees. 3

King-Bee; as the first sort of Bees.

The King is a fair and stately Bee, having a majestick gate and aspect, being almost an Inch in length, somewhat longer than a Drone, yet not so big save only in the upper part of his third division; he is almost as long again as a common Honey-Bee; his tongue is but half the length of a common Honey-Bee's, and his fangs are shorter than theirs are; for they with their long tongues gather Honey, and with their fangs, wax, &c. which nature seemeth in part to have denyed him, as having no need to use either (as they do) being to be maintained as other Princes are.

His wings are of the size of the common Bees, which seem very short, because of the length of his body; for they scarce reach to the middle of his nether part, his leggs are longer and stronger than the common Bees: his hinder, or nether part, is longer almost by half than his foreparts; and his end, or tail, more peaked than any other Bees, in the point of which peaked end is his sting, and under his sting is his place for the evacuation of excrement.

His colour is a brighter brown than any other Bee's, until he is above a year old, and then he grows blacker: his belly is of a sad yellow, deeper than gold: his nether part hath four partitions separated by lines going over cross his belly, which lines are of a golden colour, being of a brighter yellow than the rest of his belly is: his thighs, or hinder leggs, are near the colour of his belly: moreover,

some of them have a spot on their forehead while young, which soon wears away.

The King-Bee hath a sting, which though not so large, nor so long, yet is more acute than the sting of any common Bee, and he hath also a better command of it than they have; for when he useth his sting, he doth not leave it behind him, as they do, but he uses it seldom, being armed with Majesty, his Subjects valour, and willing obedience. I have had about twenty King-Bees in my hands this last year, and could provoke but two of them to put forth their stings, unless they were hurt.

Also the Male among Wasps, which some call the Mother-Wasp, stings more venomously than the common Wasp doth.

Concerning the King-Bees, I think it will not be amiss here to recite what *Pliny* hath written of them in his Natural History, *lib. 11. cap. 16. Omnibus forma semper egregia, & duplo quam cereris major, penna breviores, crura recta, ingessus celsior, in fronte macula quodam diamare candicans: multum etiam nitore a vulgo differunt*: That is, they are all of a more excellent form, and greater by half than the rest, shorter wings, straight thighs, statelier in their gate, a certain spot in their forehead, in the shape of a Crown, and they differ much from the vulgar Bees in point of their brightness. The King-Bee commands and orders all, as I shall shew, when I come to the Government of Bees.

There is of this sort one in every Colony or,
Stock

Sect. I. *Properties of Bees.*

Stock of Bees, and but one from the end of *July*, or beginning of *August*, until the *April* ensuing, and then young Princes are bred, and kept all the Summer in order to swarm, and supply the place of the old King in case of mortality.

CHAP. III.

Of the common Honey-Bee.

THE second sort of Bees are the common Honey Bees, which I thus describe. The common Honey-Bee is a flying Insect, having four wings, and six leggs; in shape oblong and little, in colour brown, having three partitions on his belly, with silver-coloured lines going cross; his eyes are oblong and covered with a Horny membrane, or tunicle, of a shining black like jet, and immoveable, being placed on the out-side of his cheeks, or rather are instead of cheeks; he hath two horns pliable and bending, with two joynts, one close to his forehead, the other in the middle; he hath two fangs in fashion of a pair of pincers, which hang not one over another, but sidewaies one against another; his tongue is so long, that his mouth contains it not, and he doubles it, and puts it between his fangs, under his chin and neck; his tongue is divided into three parts, whereof the two outmost are as a case for the third,

which is longest, and most used; his tail is somewhat sharp, within which is his sting fast joyned to his entrails, under which he hath a place for the evacuation of excrement, which he doth most commonly flying, and that is the cause (if cloths in drying are spread on the ground near them, in the Spring when they first fly abroad, or in a fair Sun-shiny day in Winter) they do stain the cloths with their excrement.

The common Bees being divided into bands, have their severall Leaders and Officers, which, according to their Kings orders, do their work by turns, some watching, others killing their Drones, whilst others are cleansing their Hive, and others abroad; all working for the benefit of the whole; and thus they all work as long as they live, and the older they grow, the blacker they are; so that by their colour you may distinguish, which Bees are a year or two old, from those which are younger, as well as by their ragged wings.

The Bees have all their parts for several uses; their eyes to see, their horns to feel, being guided by their touching, especially in the dark Hive; their two fangs in manner of pincers, being their strongest parts to gather generative matter from vegetables, which they fasten on their thighs, or hinder legs as they gather it; (by generative matter, I mean, an organizable or animable matter extracted by the Honey-Bees from Trees, Plants, Flowers, &c. and by them put into their proper Cells or Matrixes, which being there duly

duly mixed and invigorated with the sperm of the King-Bee (in which sperm I conceive the plastick power and energy for production of young Bees doth reside) hath such an alimentary quality as is adapted by Nature to supply nourishment to the grubs in order to their augmentation, as the white and yolk of the Egg is to the *cicatricula* for the production of a Chick by the gentle and mild heat of the Hens incubation. Also with their fangs they bite and kill their Drones; with their leggs they crawl; with their wings they fly; and with their stings they defend themselves from, and offend, their strongest enemies.

CHAP. IV.

Of the Drone Bee.

THE third sort of Bees are the Drones, which are the largest Bees in an Hive, having eyes, head, wings, body and leggs all proportionable to their magnitude, and two moveable wreathed horns growing out together between their eyes, but extending like a fork; their tails are obtuse and large at the end; their colour brown; they have neither stings nor fangs, which is the reason they are so easily beaten and killed by the Honey-Bees, having no weapons offensive or defensive.

They are of such use in the Hive for hatch-

ing the young brood in the Summer time, especially when honey-dews fall, that no Colony or Stock can well thrive without them; for they are as Servants or Nurses under the Honey-Bees, to help hatch up the young brood, whilst the other are abroad at their labours; as I shall further shew when I come to the generation of Bees; and their bodies being large, they cover the more room with the smaller numbers.

CHAP. V.

Of their Properties in general.

TO speak something of their Properties, Bees are creatures full of wonders, being not altogether tame, nor absolutely wild, but between both, yet indocible, for most they do is by instinct; and although there do not appear those outward organs of the senses which other Animals have; neither is seen in their heads that inward principal part, the brain, which is the fountain and seat of the internal senses, viz. common sense, phantasy, and memory; yet have they the senses themselves both outward and inward, which their subtle and active spirits do excite and quicker; so that as the Honey in the Honey-comb, excels all other things in sweetness, so do the Bees themselves excell all other creatures (in things

things relating to themselves) in Art, Wisdom, or Foresight, Industry, Valour and Loyalty, having also the perfect use of the five external senses, as seeing, hearing, feeling, smelling and tasting: their excellencie in one thing or other, is shewed in almost every part of this Book; yet here, in the next Chapters, I shall give you a tast of my reasons and experience, that these excellencies are in them, and that they exercise them.

CHAP. VI.

Of their Art, Wisdom, or Foresight.

AS for their Art: a Bee, the first day of his flying abroad is an exquisite Chymist, extracting from herbs and flowers, and other things, honey, wax, generative matter, and what else they want: to do the least part of which would require time in men to study and practise.

Their Art appears further in their excellent Architecture, which is by the framing of their several Combs, and hexagonal Cells, so mathematically exact, that the bottom of each Cell of one side, hath its foundation upon three lines of three Cells on the other side, meeting all in one angle right in the middle of the opposite bottom, by which the strength as well as the beauty of the same is much augmented.

As

As for their Wisdom and Foresight; a sure testimony of it is, that it is natural for all those Bees that are bred in Summer, so to foresee and know that a Winter will come, as wisely to consider it, and therefore do they so earnestly provide for subsistence before it does come; which we can hardly learn our children in thirty years, if then.

Also their foresight of a storm approaching, makes them hasten home, although but half laden, to secure their own lives.

CHAP. VII.

Of their Industry, Valour and Loyalty.

AS for their admirable Industry, that appears by the indefatigable pains they take for the good of the Common-wealth; none of them for age desiring a Writ of Ease, but being all volunteers in all the sorts of their labours, some of them I think it not improper to mention; for, besides their gathering of honey, wax, and generative matter, and building their combs, they have several other businesses, viz. where occasion is, some breaking down pieces of rotten combs for repairs, others carrying out their dead, others haling out abortives, others cleansing out filth, others being upon the guard to keep off Robbers and Strangers, in this form, placing themselves in five or six files,
eight

eight or ten deep upon the floor of the Hive, so that all the Bees pass between them, where, by no stranger can pass them but is seized on, and brought to condign punishment; others of them submitting themselves into the use of bridges and ladders for the rest to pass from place to place upon, where there wants a conveniency in the Hive; thus; single Bees linking themselves to one another the length of six or seven inches, and enduring for a considerable time in this form, the abundant trampling of passengers.

As for their Valour; therein they surpass all creatures, I shall here mention but one instance: for a single Bee near his Hive, if a man do but affront him, shall pursue him, though he were in the midst of an Army, and not leave him for all the terrors of gunshot, though whole volleys were discharged against him, and though he be stricken down to the ground several times, yet he shall not quit his pursuit, till killed or disabled.

As for their Loyalty; no distaste from their Prince, or hardship endured, can make them quit their Love and Loyalty to him, as I shall farther make it appear in treating of their Government.

CHAP. VIII.

Of the five Sences in Bees.

AS for their use of the five exterior Senses: That they see, I think none doubts, because they take notice of their new dwelling, by flying about it; and going remote from home, at their return they can hit the little hole of their entrance.

Their Hearing also is as perfect as any other Sense; for they hear the voice of their King-Bee upon all occasions, and the several signal notes for preparing to swarm, otherwise what means the ringing of pans to stop a Swarm from flying away? but to confound their hearing of their Leaders voices and notes.

Also by their several notes and hummings, the Bees give notice to one another when their King is absent, and when he returns again: insomuch that when I have kept their King some space of time from them, though the numbers of half a swarm were abroad in search after him, yet upon hearing that joy which the Bees at the door expressed by their notes when I put their King to them again, all those Bees flying about in search after their King, immediately returned home at once, to the admiration of many beholders; for I have done it oftentimes, in several places.

Their

Their Feeling is very subtle; for, in the dark Hive they are guided by their little weak horns, and at their touch of them against any thing they will give back; but if some doubt and will not believe that Bees feel, I counsel them to put their hands into an Hive full of Bees, and so they may be feelingly resolved of their doubt whether Bees feel or not, for (if I mistake not) the Bees will feel their hands to sting them; but put a dead thing among them, though they feel it, yet will they not sting it.

Their Smelling is very quick, even to a proverb; for if one Bee is killed near the Hive, the others are by the scent of him crushed, made so angry, as to seek revenge; and this I have often experienced; so that when I have accidentally killed a Bee, I have been forced to go away until the scent was over, to avoid the anger of the rest.

They scent an Honey-dew presently, which draws them almost all out of the Hive to follow their work, which they do whilst it lasteth, with greater earnestness, than men work in the time of Harvest.

Also by this sense only, they know robbing Bees in their Hives, and distinguish their friends from their foes, when great numbers are fighting together.

Their Tasting must needs appear, when we consider that they could not otherwise distinguish different Tasts: for nothing so much delights their curious pallats as the most delicious things.

To

14 *Of the Natures and, &c.* Sect. 4

To conclude this Section: All these excellencies and more, are in them, which might be made more evident by abler persons, in studying of Nature, they would also study the Natures of these little, yet wonderful creatures: However, you will find in this Book, here and there as occasion offereth further proofs of what I have written.

The Bee excelling in many qualities, verifie some proverbs of him as followeth.

As {	Profitable	} as a Bee.
	Laborious	
	Loyal	
	Swift	
	Nimble	
	Quick of Scent	
	Neat	

These wonderful parts and properties of this little creature, are so many evident proofs of the Infinite Wisdom and Power of the Creator, as was well observed by *Du Bart* in his Works on the Creation of the fifth day; thus:

For, if old times admir'd Callicrates
 For Ivory Emmets, and Myrmecides
 For framing of a rigged Ship so small,
 That with his wings a Bee could hide it all:
 Admire we then th' All-wise Omnipotence,
 Which doth within so narrow space dispence
 So stiff a Sting, so stout and valiant heart,
 So loud a Voice, so prudent Wit and Art:
 Their well rul'd State, my soul so much admires,
 That durst I loose the reins of my desires,
 I gladly could digress from my design
 To sing a while, their sacred Discipline;

Of which Discipline I am next to discourse;

Section

Section 2.

Of the Government of Bees.

CHAP. I.

Of their Government in general.

THE Bees enjoy a peaceable and quiet State, under one Monarch; so that every Colony and Stock of Bees is, within its self a particular Kingdom, having one only King to whom they all yield obedience, maintenance, and defence: For when they have no King, they pine away and die: and under two or more Kings, they will not be; for (as if they knew by instinct) that they cannot serve and obey two Kings at once (as no man can serve two Masters) so they will neither work, nor breed, nor be quiet, until all the rest (when by accession of two or three Swarms together, more Kings are among them) are deposed, by that King who sits on the Throne: for, as was well observed by Mr. Butler, page 5. of his Book of Bees, *The Bees abhor as well Polyarchy as Anarchy, God having shewed in them unto men, an express pattern of A perfect Monarchy*

§ 2. *Of the Government of Bees.* 17

narchy the most natural and absolute form of Government.

The Egyptians, by the Hieroglyphick of a Bee, signified a King. Without doubt, they could not fitly resemble the Majesty of a King so well by any other creature, as by the King of the Bees, who is a natural King, and set apart by Nature her self for that very end. For, those we call the Kings of Beasts, and Fowls: The Lion, and the Eagle, have no Subjects but what are in rebellion, because they do not protect, but devour them. But the King-Bee, though the most absolute Monarch, yet is attended with all the Love and Loyalty imaginable from his people, because he devoureth none, but is a cherisher of, and benefactor to all.

Also his place of abode makes the Court; for, where he is, whether within or without the Hive, such a retinue of Bees alwaies attends him, as may be supposed to wait on him. But in all exigencies and disturbances they have greater recourse to him than ordinary, flocking about him as well to defend him in case of danger, as to receive his orders, as Souldiers and Officers to their King, or General.

C

CHAP.

CHAP. II.

Of the Bees necessity of a King.

THAT Bees must of necessity live under a King is apparent: for without a King they will either die, or yield to their enemies the robbers.

They pine away and die; because they cannot breed, as I shall shew when I come to the generation of Bees. And they will in few daies yield to the robbers for want of a King to order their battels, for instances thus: both in swarms, and stocks.

A Swarm, though settled and hived, yet if their King Bee happens to miscarry and so not come to them (as it sometimes falls out) then having no King they will never stay in the Hive, but go all out, and return home again: and sometimes they return home again without settling any where (that is) as oft as they miss their King so soon; which is the cheif, if not the only cause that Swarms so often return home again after they are swarmed.

A Stock or Colony, when their King dies, or happens by any accident to be lost, unless there be a successor in the Hive of the Royal issue of King-Bees, the whole Stock or Kingdom will certainly perish, either by pining away if dead, and losing themselves in searching after

2. § 2. *Of the Government of Bees.* 19

after him if lost, or else by yielding to the robbers.

That they pine away & lose themselves, those who keep Bees do sometimes experience : when they find a rich stock well filled with honey, abandoned by the Bees, so that scarce one is left in the hive, though in the fall it was left full of Bees ; which happens no other way but by the loss of their King : for otherwise the Bees never leave that store ; which to obtain they have bestowed so great labour and diligence, for if they had died with cold, the Bees would have remained still in the hive, though dead, and in the same form and place they kept when alive.

That they yield to the robbers appears thus : if after the loss of their King they do not all within a while lose themselves, yet in their languishing condition, as soon as the robbers come in great numbers to attach them, they will easily yield both themselves and substance to them, the consequence of which will be, that they will help the robbers in carrying away their own substance to their liyss, and so live with them, under their King, this, occasioned *Virgil* in his *Georgicks lib. 4.* to write of them as followeth.

*Præterea, Regem non sic ægyptus, et ingens
Lydia, nec populi parthorum, aut medus Hy-
daspes*

*Observant : Rege incolumi mens omnibus una est,
Amisso, rupere fidem : constructaque mella
Diripuerunt ipsæ : et crates solvere favorum,*

20 Of the Government of Bees. § 2.

*Ille operum custos, illum admirantur : et omnes
Circumstant fremitu denso, stipantque frequentes,
Et saepe attollunt humeris, et corpora bello
Obiectant, pulchramque petunt per vulnera mor.*
(rem.

Which for some satisfaction to those who understand not the Latine Tongue, there being many such who keep Bees, I have thus translated.

Not *Agypt*, *Lydia*, nor *Hydaspes* pay, (they:
Nor *Parths*, such worship to their Kings as
The King b'ing safe, in all things they agree,
But he b'ing lost, they seem to mutinee,
In which themselves do bring by this confusion,
Their food and fabricks to a dissolution,
Him, being their preserver, all admire,
And strongly guard his person; then retire
To bear him on their shoulders, and in wars
Their bodies they expose, not fearing scars,
Only their King to save, they alwaies do
In his defence, their sweetest lives forego.

Under this Monarch each Subject hath a publick spirit, for each worketh, watcheth, and fighteth, for the good of their King and commonwealth, and without any private respect, sharing equally in all their accommodations; and though they freely act in all their undertakings, yet they do all in subordination to their King, and with reference to the publick.

CHAP. II.

Of their Government in particular.

THeir Government is in the person of the King, from whom all the Bees *pro tempore*, i. e. for the present time receive their orders, as well the Captaines and Officers among them, as the commonalty.

His Government is severe, just, and absolute, severe, like that of the Grand Seignior towards the race of the blood Royal, for, as soon as swarming time is fully past, all the younger Princes being kept in their private places which are usually neer those pavillions in which they are bred, being in the lower parts of the Hive, are expelled or executed by the Kings orders then sitting in his Throne; the reason of which severity is the same with that of the aforesaid Grand Seignior, lest some of the Royal Issue expecting to raign (and swarming being prevented by the approaching winter) dispaire of having Government, and so usurpe the Throne of the rightful King.

And as nature seeks self preservation, so knowing that otherwise they must die at home, sometimes three or four Princes do go out in a second swarm, each of the younger being thereby in hopes not only to escape with life but also to get a Kingdom, and

22 *Of the Government of Bees.* § 2.

then he of them, who first can get into the Throne of the new Kingdom, preserveth his own life, with the death of all the rest.

His Government is just; because he oppresseth none; the consequence of which is, unity throughout the whole Kingdom.

His Government is absolute, because his orders are never disputed but obeyed, as well in swarming, and executing their Drones, and young Princes, as in watching, and working; as followeth.

CHAP. III.

Of the Obedience of Bees to their King.

THE willing and cheerful obedience of Bees to their King and his orders, is manifest, because without him they work not, and because they can have no orders without a governour, and no governour but a King, therefore it must of necessity follow that they do obey his orders when they work or do any thing in the Hive: for unless they had orders for each several work they do, how could they distinguish their several works without confusion? viz. Some killing their Drones only, some burying their dead, others cleansing filth others only on their guard, and others hatching the young brood, whilst others are abroad at work, some gathering matter for

§ 2. *Of the Government of Bees.* 23

for generation, others fetching in water, whilst others are gathering wax or hony: what else can this exact order in all their actions, and that they do not all the same works together, argue? but their absolute obedience, each band following his own appointed work till it be finished, and not intermeddling with the work of another band, but only in disturbances by noise or otherwise, or access of strange Bees in great numbers, and in case of Hony-dews, for then they leave off all other employments to fetch in hony: that being the general work to which all the other tend, their own instinct also joyning with their Kings general orders in that work: for in an Hony-dew Bees neither rob one another, nor fight, nor swarm, nor kill their Drones, nor watch, nor do any other work but fetch in hony, and lay it up hastily in the Hive to be presently gone again for more, and not so much as staying to stop up their Cells where they put their hony, until afterwards: and thus it is only at such a time, and so long as the Hony-dews are falling; and until the Sun by shining hot dryeth it from off the leaf of the Oak-tree, and other places whence they take it.

Bees never swarm but by the order and consent of the King; and when they swarm, it is in obedience to him, as Mr. Butler also testifies, *page 3.* of his *Feminine Monarchy*, speaking of their Ruler as a Queen, in these words; *If by her voice, she bid them go, they swarm.*

The Causes of Swarms are different; the Reason of the second Swarms are not the same with those of the first Swarms, as I shall shew in this Chapter; for the Bees lack not room when the second Swarms go forth. The reasons of the first Swarms are the same with theirs who plant themselves in any new-found place, and settle there, without intention of removing thence again to their old habitations. The chiefest Cause is lack of room, the other are but the circumstances as the consent and order of the King; good weather, a prospect of plenty to come, and fitness: which fitness is when the Hive is quite filled with Bees, and they have store of riches, and a King-Bee ready without all these circumstances, Bees seldom swarm though they do want room, but all these circumstances conjoyning with lack of room, is the certain cause of first Swarms; but where they have room, as in Colonies duly raised, the Bees never swarm but in case of distaste, by accident, disturbance, or mismanagement, which is very rare.

The Causes why Bees swarm not when fitted, and wanting room, as in some strong Stocks, is, because being full and rich, the King will neither leave his Kingdom, nor part with his People, lest he should be thereby impoverished; and then the Bees make Combs where they lye out. And Colonies although strong, rich, and full, yet having room added to them, the Bees continue their

§ 2. *Of the Government of Bees.* 25

their working without idleness or intermission as long as Hony-gathering lasts.

Although many times two or three Kings go out in a second Swarm for the reason before mentioned in the last Chapter; yet I never knew but one to go forth with the first Swarm, and then the old King generally goes forth himself with them, because having a prospect of a more rich, pleasant, and flourishing Kingdom, he leaves his decaying and unpleasant Kingdom (by reason of the stoping and noisomness in the old Combs) to his Successors; and with him the greater number of the Bees will go, and that is the cause that Bees so often over swarm themselves, and leave the old Stock thereby so lean, that sometimes they die for want of numbers to keep them warm in Winter, or else for want of food in the Spring, or at best are two Summers after before they recover themselves to be in good case again.

Mr. *Butler* (the most judicious Writer of Bees in his time) *page* 70. and 75. of his Book, supposeth that the first Swarm went forth at the will of the Commons, because he very rarely heard those musical notes of the King-Bees answering one another (which are well known to be the certain signs of a second Swarm to come forth; for the young Prince is expelled, if the King gives not his consent by answering his petition in three or four dayes) till after the first Swarm was gone forth: and when the first Swarm returned home again, he could as seldom hear those musical

26 *Of the Government of Bees.* § 2.

musical notes in order to their second going forth, though he could constantly hear them before the second Swarm did come forth: which supposition of his appears to be against later experience. For the King orders at once what the Bees readily execute in obedience thereunto, and so he hath no need to give his consent or orders for another King to go forth when he intends to go himself.

And if the King-Bee which first goes forth, through Age, and want of flying well, or the like, happens to miscarry, and with his Attendants perishes for want of coming to the place where the Swarm is settled, then the Swarm finding themselves without a King, return home again to their relinquish'd Prince, as sometimes it happens, *viz.* as often as Bees return home again after they are swarmed and settled (for sometimes the Bees miss their King before they settle, and then they return home again without settling at all) but when it happens thus, then that Prince who is King by the loss or death of his Sire, taketh his own choice, whether he will go himself, or send his younger Brother, and when he will not go himself, whether the Bees shall swarm again or not: so that it appeareth by this, that Bees swarm not their first Swarm, but according to the orders of their King as well as their second Swarm, which all experienced Bee-Masters know is not without his consent and orders.

The reason why first Swarms will not go forth

§ 2. *Of the Government of Bees.* 27

forth but in very good weather, is because the King goeth when he pleases : and second Swarms go forth at the time appointed in any indifferent weather, because their King goeth forth at the will of his King or Sire ; who oft grants leave, being propitious to the Royal Lineage ; which indulgence of the King to the Royal Lineage, is the only cause why Bees swarm when they have room enough, as in second Swarms (except only the cases of disturbance and distaste) of which indulgence there is little occasion of use in first Swarms.

Bees often provide themselves of an habitation before they swarm, *viz.* as oft as they fly quite away from their owners without settling , for they have not reason to know that their owners will give them an house, and so settle to be put thereinto : but when they are not before provided, it is because the quick and often flights of young (especially in wet weather) suddenly fill the Hive, whereby they lack room, and then they are as suddenly forced out by the present orders of the King, and so they settle to take time to look out for a place, in which juncture of time comes the owner and furnishes them, before their Scouts return : and if the King be with them, and the Hive drest, they will stay in the Hive given them ; otherwise they are discontented, and will not stay therein.

Sometimes also they settle in order to fly all away at once, being before provided of
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28 *Of the Government of Bees.* § 2.

an house, and then they will not easily stay in the Hive given them, unless it be very well drest.

CHAP. V.

Of the Bees Loyalty to their King.

THAT Bees naturally abhor Rebellion and Treason, I doubt not, because I never knew, or heard of any disturbance in an Hive of Bees within themselves, and when other Bees come within the Hive, their fighting with them shew their Loyalty to their own King, because none of the Bees will take part with the Invaders; but all fight to the last against them to preserve their own Sovereign in safety.

The Bees Loyalty to their Sovereign wonderfully appears by their excessive love to, and industrious care of his person: for without him they value not their own lives, as you may observe by a Swarm though settled and hived, yet if without their King, how discontented the Bees will be, and will not stay in the Hive by any means that can be used, but return home again, whilst others of them that attend him, though but an handful some distance from the Swarm (perhaps) fallen on the ground, where they encompass him about, yet there, that handful will live and die with him, rather than forsake him;
if

§ 2. *Of the Government of Bees.* 29

if he cannot reach the Swarm, which happens as oft as the Swarm cannot find him to come to him; for, it is for want of him they do return home again after they are settled or hived.

And you may observe by a Stock or Colony when by any Accident or Mismanagement the King happens to be lost, they presently miss him, and then many of them fly abroad in search after him whilst the rest languish at home; and if the others return not in a while, many of them also go out in search after him, and thus they give not over searching for him, till either they find him or lose themselves dying in their search. Of which I shall here relate one example for the satisfaction of all Persons who read this, which example is thus: About the end of *August*, 1678. within one week before his Majesty went to *Windſor*, at his Majesties own Bee-house in the Royal Garden in *St. James's Park*. Which House I had erected the Spring before. The Kings Majesty and some Persons of Honour being then present, I took the uppermost Hive off of a Colony, and having taken the Bees out of the Hive from the Honey and Combs, I took also the King-Bee which was in the uppermost Hive at that time, being late in the year, I kept him some time; and put all the Common Bees to their fellows that were at home in the lower parts of the Colony (with their store of Honey which is left for their Winter-store) the Bees presently went home crouding

30 *Of the Government of Bees.* § 2.

crowding one another, as Sheep into a fold without taking wing, and when they were all within, the first work they did (as is their custom) was upon this disturbance to see if their King were safe, and among them; (whom I still kept from them) and missing their King, presently some fly abroad to seek him, some crept, and others ran up and down, as men in a tumult, or like unto persons distracted: then I put their King into the Colony to them, and in the space of two minutes, which was as soon as possibly they could know throughout the Colony that their King was come home, the Bees did presently by their actions and voices proclaim it at the door, upon which, all those that were abroad, and flying about in search after their King (which were almost half the numbers of a second Swarm) immediately returned home, where they all together seemed to make a cheerful noise among them, to the admiration of all that were present.

I have also done the like, and had the same effect with several Colonies, where I have come too late in the year; but although I can do it my self at any time of the year with safety to the King Bee and Colony, yet my advise to young Practitioners in this Art is to do it whilst the Drones are in the Hive, and the King-Bee in the middle Box, as I shall further shew in its proper place in taking off the uppermost Box.

CHAP.

CHAP. VI.

*Of the Bees Valour, Justice, Manner of
Fight, and Places.*

THeir Valour exceeds all creatures, fearing no enemy, how great soever though never so terrible, especially near their Hive, and in defence of their King, for nothing but death can quell them, because they will never yield.

The Bees are very just to one another, and not the least injury is offered among them, within their own Kingdom; but the Bees of several Stocks and Colonies are not so, for being so many particular Kingdoms, each of them are concerned only for their own Kingdoms welfare; which together with their jealousy of being robbed, is the only cause why they kill any strange Bees that through mistakes come into their neighbours Kingdom, but sometimes they will not kill one that comes so when he is alone, and well laden, but suffer him to go out again, because they know that such come not with intention to rob and steal.

When Bees fight with Bees the King orders the battel (except in small skirmishes when those only fight which are appointed to watch) and walks up and down animating them with his voyce, and like a General rallying

32 *Of the Government of Bees.* § 2.

lying his scattered troops, and when he leads them on, they are so sensible of his worth that they unanimously expose themselves to death it self to save him harmless, and in their fighting they bite one another with their fangs, sometimes by their wings, sometimes under their wings, & sometimes by their legs, for they seldom use their stings one against another in their fighting, never unless much provoked, and not able otherwise to right themselves; as when they oppose men, cattel, or fowls, because they know that it is death to themselves, as *Virgil* mentions, *Georg. lib. 4.*

----animamque in vulnere ponit.

The Common Bees in their fighting with one another, neither give nor take quarter, neither is there any cessation of hostility among them, until one side or the other be Victor by the total destruction of the weaker party, unless when two Swarms come, or are put together before they are settled in their new habitation, then sometimes they proclaim a general silence; and then if one of their Kings hath his residence in the place of his Throne, the other is expelled or slain; but when both the Kings are alike in their places of command, then the Bees fight it out.

Another occasion of their cessation of hostility, is when they are disturbed by Art, which is by spurring with the mouth so much strong Hony-liquor, or Ale among them, that they may smell all alike; the reason of which is, because

§ 2. *Of the Government of Bees.* 33

because they distinguish one another by the sense of smelling, and by disturbing them thus artificially you may put any Bees together at any time, and prevent their fighting.

The King-Bee's Throne is in the top of the Hive, to which he alwaies hastens when any disturbance happens, and thither to him repair the Hony-Bees (as may be supposed) for orders and directions, especially in case of a fight.

The Bees in the Hive lodge not in the cells of the Combs, they serving only to breed in, and to lay up their stores of Hony, only the Pavillions in which their Kings are bred they never put any Hony into, the Bees (unless in Summer when they fill their Hive) creep all together close between the Combs where they make one entire globulous body neer the upper parts of the Hive. The common residence of the King-bee is in the center or middle of this globulous body, except, in case of disturbance, and then he hastens to his Throne.

To conclude this Section you see that Bees (creatures without reason) have not only prudence and foresight, joyned with art and industry, but perfect order and discipline in their government, being naturally loyal, valiant, and magnanimous, and abhorring as well rebellion and treason, as cowardise and sloth, all which plainly shew that nature in Bees laying down such a pattern should not only be imitated, but surpassed by men, lest

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they

34 *Of the Government of Bees.* § 2.
they should be reproved by these unreasonable creatures, as too many are, who have not only reason, but the light of the Scriptures to guide them in the exercise of those vertues so plainly seen in the Bees.

Section 3.

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Section 3.

Of the Generation of Bees.

CHAP. I.

Of their Breeding in general.

THE Bees begin their breeding of young sooner or later, according to their strength and numbers, for the greater their numbers are, the greater is their heat, and by how much their heat is greater, by so much the sooner do they expedite their young brood to fly; but all Bees begin to breed as soon as they are able to fly abroad, and the Trees and Flowers begin to bud, which is commonly about the beginning of *March*: they breed all the Summer time, and leave off breeding as soon as the time of Honey gathering is fully past, which is commonly in *August*; and then they hatch up only what young are in the Cells: the reason of their breeding thus constantly, is for propagation and continuance of their kind, and that they may have the greater numbers when Honey-dews fall: for we see those Stocks or Colonyes which have the greatest numbers of Bees are alwaies the richest.

Concerning the manner of the generation of
D 2
Bees,

36 Of the Generation of Bees. §. 7.

Bees, several Authors have written variously of them as followeth.

Aristotle, Pliny and Virgil call the Ruler of the Bees by no other name than *Basileus*, and *Rex*, i. e. King.

Aristotle concludes; coeunt ea in quibus mas & femina est, Those creatures conceive by copulation, where there be males and females.

And again; they that are bred of the same sort, or kind, if there be among them male and female, e coitu generantur, they are bred by copulation.

Cardanus denies that the Bees lay Eggs.

Aristotle argues, that Bees engender not together, because there be but few young in their Cells, and they not quickly hatched; but other Insects that are procreated by copulation engender long and hatch quickly: And whereas Aristotle relates it as an Opinion of others, that Bees breed by copulation, and that the Drones are males, and the Honey-Bee females, this, saith Scaliger, is false, for the Bees indeed are females, but the Kings are the males.

Mr. Muffet also acknowledgeth no male among the Bees but the Kings.

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Mr. *Remnant* in his History of Bees saith, that the matter in which they blow or breed, is something that they gather off the Flowers or Plants, and bring home, and put into the holes or cells of the Combs, which they mix finely with a little water, and then blow in it a little thing as big as a Fly-blote.

I conceive the matter he means is that organizable matter I spake of page 6. and by the little thing I conceive he means the sperme which the King-Bee injects into each matrix to that matter.

Mr. *Butler* in his feminine Monarchy concludes that the Drones are males, and that the Ruler, and the Honey-Bees are all females, withal page 54. asserting that the Bees use not copulation; but conceive in a secret unknown way by the Drones.

Mr. *Purchas* also in his Theatre of insects asserts the Drones to be males, and the Honey-Bees females; but how the Honey Bees receive a prolifick vertue from the Drones he discusses, denying that they use copulation and citing *Albertus magnus libr. 26.* as saying that Bees use not copulation, yet granting the Drones to be males, and the Honey-Bees females. Then he further saies that the Honey-Bees may have a masculine vertue from the Drones otherwise than by copulation; instancing in the Eele and other Fishes that produce their young without copulation; but I think he was besides the mark in his instance, because those creatures produced in the watry region cannot be examples of those produced in the airy

airy region, besides the Fishes spawn receive
prolifick vertue from the males.

Some others grant the King-Bee to be the
parent of all the Bees, but yet suppose him to
be a female, and that the sperme which he
ejects are Eggs, and that that part of his bo-
dy whence he doth eject it, is her matrix.

Having thus layd down the opinions of se-
veral Authors, and finding by my experience
that there have been divers mistakes by several
concerning the sexes of the Bees, and their
manner of breeding, (divers of them in their
writing also concluding, *non tamen satis adhuc
explorata que eveniant habemus*, that is, we
have not as yet sufficient experience what
may happen) I shall therefore conclude their
mistakes under three heads, viz.

First; that the Drones are males, and the
only males among Bees.

Secondly; that the Honey-Bees as females
(though without copulation, yet) do con-
ceive by the Drones.

Thirdly; that the Ruler of the Bees is a fe-
male.

I shall therefore here lay down the reasons
why I differ from their notions, and in the next
Chapter lay down my assertions, and endea-
vour to prove them.

First; Its not probable that the Drones
should be males because there are none eight
whole months together, so that of necessity
the Honey Bees must be pregnant above eight
months together, when we see the Bees fi-
nish each several Brood in less than thirty
daies

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daies time in the Spring, and sooner in the summer time, for in all the cold winter season all men (that keep Bees) know that there are none young in the Cells.

Secondly ; If the Honey-Bees as females did conceive by the Drones, they then must of necessity conceive for three or four births before hand; for we see that the Bees breed no Drones until the second brood is fled, and commonly not until the third Brood is fled. So that I conclude, that it is no more probable that Bees should go eight or nine months pregnant with a treble conception (of which also they must be delivered before the Drones have any being.) than for a Mare to conceive three Colts at once and be delivered of each Colt three Months time one after the other.

Thirdly, If the Ruler of the Bees were a Female, she could not breed any Young without influence from the Drone, any more than the other Bees could ; nor lay prolifick Eggs, but by influence from some Male, and none could ever yet assign any Mate for him.

Fourthly, Were the King-Bee a Female, this absurdity would follow, *viz.* that she must conceive without a Male, and have of her self *ab initio*, Eggs of an active quality and power for production of young Bees, which experience tells is not possible, for his sperm (though at first ejection thereof it hath some form, as also hath a drop of liquor falling down, yet it) dissolveth with the heat of ones hand, which no Egg of any Insect doth ; for though the

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Eggs of Insects have not a perfect shell, yet have they a certain skin inclosing every distinct Egg, not easily frangible by a gentle touch, but this Sperme of its self dissolveth, whereby it is mixed with the animable matter to which the King-Bee injects it, into each matrix: in which matrix, the Egg is formed for the production of each Bee.

Fifthly; I differ from their notions of them, because this Sperme is generated naturally in the body of the King-Bee, as is the Sperme in a Cock, or in the male Silk-worm.

But Sixthly and Lastly; I differ from their opinions because the Bees do never copulate, and therefore there is no need of the Drones for that purpose; for the Bees do breed their young without copulation according as *Virgil* in his *Georgicks lib. 4.* writ of them as followeth,

*Illum adeo placuisse apibus mirabere morem,
Quod nec concubitu indulgent, nec corpora segnes
In venerem solvunt; aut fetus nixibus edunt:
Verum ipsæ foliis natos, et suavis herbis
Ore legunt: ipsæ regem parvosque Quirites
Sufficiunt, aulasque et cerea regna refigunt.*

Which I have thus translated.

It is a wonder worth our observation
That Bees breed young, not using copulation,
Nor spend themselves in Ven'ry: but without
use
Of birth: from Herbs and Leaves their young
produce For

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For; with their fangs, their progeny they
take

And Princes too, with Courts and Kingdoms
make.

And if the Bees do breed without copulation (as almost all writers do agree because it was never yet seen by any man) then I see no ground to believe there can be any conception, and without conception I think there can be no parturition or bringing forth either of young or Eggs that be prolifick, and in the body of the common Honey Bee I could never yet find any thing like Eggs or Sperme, nor any other as ever I read or heard of. But for any Female to conceive without copulation, it can be no otherwise but by the wind, as *Aescops Babylonian* Mares (in the Fable) conceived by the Horses that were in *Agypt* the same time. Or as a pair of Breeches lying upon a Bed got the maid with child.

CHAP.

CHAP. II.

Of the Generation of Bees in particular.

THE assertions which I lay down concerning the manner of the generation of Bees are three.

First; That the King-Bee is a Male, and the only Male in every Colony and Hive of Bees.

Secondly; That the common Honey-Bees are the Females, but not by vertue of any copulation or conception, but because they supply the place and Office of the Female.

Thirdly; That the Drones are neither Males nor Females, but servants under the Honey-Bees, produced by nature to supply the absence of the honey-Bees for a time.

To prove these three assertions, I shall lay down three reasons and then proceed to shew my experiences concerning the breeding of Bees.

The first reason is, because it is the property of the Male, and of the Male alone, to eject Sperme; And the King-Bee only hath Sperme, and doth eject it; and therefore, he, and only he, is the Male among the Bees.

The second reason is, because it is the property of the Female to prepare the matrix, and to administer augmentation to the Sperme
so

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so as to bring forth, or hatch up; and because the Honey-Bees prepare the matrixes by building the Combs, and administer augmentation to the Sperme, by gathering of animable matter, and by putting it into the matrix, so as to hatch up the young Brood by lying close about it, and keeping it in a constant heat: therefore they (though not by copulation nor conception, yet) are the Females.

The third reason is, because as nature never produceth any creature in its whole kind without parts and instruments to perform the end for which it was produced, so likewise nature produceth no creature in its whole kind with such parts for which no end is by nature designed, and consequently the Drone being produced without parts or instruments for the production of Bees either as male or female, therefore he is properly neither male nor female but a redundancy of nature.

But more fully to prove my assertions, I shall enlarge upon each of my reasons in shewing my experiences, and afterwards answer some questions.

As for my first Reason, that the King-Bee hath Sperm, and doth eject it, any man by dissection in Summer-time or Autumn, may find that he hath Sperm in his Body; and whereas no Bee-master can averr, that ever he saw any other Bee eject Sperm, yet I do affirm, and can bring testimony, that the King-Bee doth eject Sperm in this manner, *viz.* just at that part of his body, where he is only yet

yet the full length of a common hony-Bee, he opens his body, and bending his tayle (wherein his sting is) ejects one seed at a time, which seed is white, and as small as a white thred, and somewhat bigger at each end than in the middle, and not half a quarter of an inch in length; when he hath ejected one seed, he shuts his body again by reverting his taile and sting into their usual form again, by which reverse action his part where he openeth his body is shut close again with a joynt (in like manner as do the joynts in the tail of a Lobster) whereby he retains and ejects his sperm at his pleasure. This will further appear by this example following, being matter of fact. In *August* last, in my own garden in the *Bowling-Ally* in *Westminster*, I took the King-Bee out of an Hive, and there was present with me Doctor *Hobart* a Physician, and several others: This King-Bee I kept in my hand about half a quarter of an hour, and then looking on him, we all plainly saw where, and in what manner he did open and shut his body, ejecting his seeds one by one; as above-said. The Doctor and my self, and the rest who were present, did perfectly see and know, that that which this King-Bee did eject, was sperm by its colour and substance, because after a small space of time it dissolved from its form by the heat of my hand, and that it was not his excrement; for excrement is thin and yellow, and evacuated at another place some distance from whence this was ejected, viz. just under his sting; and that it was not Eggs, but sperm, because it had

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had no skin to keep it in the form it was ejected in, as we see the Egg hath within the shell, as also hath the nit of a fly-blow, and a Silk-worms Egg. Upon sight of this the Doctor presently affirmed, that if there were but one such Bee in the Hive, he must of necessity be the Sire of all the rest: The King-Bee when he did eject this sperm, walked, and every step he took he stood still, opened his body, ejected one seed and shut his body again, then took another step, stood still again, opened his body, ejected one seed, and shut his body again, and thus he did six times ejecting six seeds presently one after another, as he walked on my hand, every step he took being the length of the distance of a Bees Cell; so that each seed, as they lay on my hand in length, did scarcely touch one another, thereby answering the distances of the several Cells in the Comb. Then I kept him about half an hour longer, and he did the same again, opening and shutting his body in the like manner, walking on my hand, until he had ejected about twelve times, and yet to our observation as vigorous and strong as at the first; after which I put him into his Hive again.

Now as no female can produce young, without influence from the male, so an whole Hive of Bees, with many Drones among them cannot breed any young if there be not a King-Bee with them; because when they have no King-Bee, they have no male among them; which I have often seen, and helped them with a King-Bee from another
poor

poor stock, with whom they have done very well, which otherwise must have perished in a short time, for want of posterity, because they could not propagate their kind for want of a male : But, for further satisfaction, that Bees breed not (because they cannot breed) young without a King-Bee, I shall here relate the following example which several Gentlemen, who were eye witnesses of the same, will testify.

A Gentleman who now lives in *Westminster*, to whom with some others I gave a visit about the latter end of the Summer in 1677, and walking into his Garden, I looked on his Bees, and perceived the languishing condition of one of his Colonies by the not working of the Bees ; and I told the Gentleman, that the Colony, through some mismanagement, or accident was deprived of his King-Bee, the consequence of which would be, that they would pine away, and die, or yield to the robbers, for they could not have a supply of young Bees by breeding, although they had Drones among them, because their King-Bee, the only male, was wanting ; then to satisfy him that they did not breed, I turned up the Colony, and shewed him their breeding places, where we all saw that all the Combs were dry and empty, except above where their hony was ; some of which I did break to let them see that it was Honey, and not young Bees in those Cells stopped up, for there was not one Grub in all the Cells : then, to satisfy them further I shewed them the inside of a-
another

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another Colony, which had his King-Bee, and there they saw store of Grubs in the Combs in the breeding place. I then told the Gentleman, I could yet save this Colony, by putting to them another King-Bee, which I did thus :

He assigned me a Straw Hive, out of which I took most of the Combs with most of the Bees, and in the crown, or top of the Hive, I took the King-Bee, and produced him to their view, after which I immediately carried him to the Colony, and about a score of Bees with him, and put them together into the mouth of the Colony, whereupon a greater company of Bees from the Colony fell upon them, and in a minute killed all the company of Bees, except the King-Bee : and although the Gentlemen thought he could not have escaped death in the croud, yet they saw clearly that when the Colony-Bees came to him, they Sopt, and as soon as all the rest were killed, and carried away, they came to him with all imaginable respect, and conducted him up into the Colony, which we through the glasses saw, and there owned him for their King ; the success of which was that immediately they fell to their labor and breeding, and bringing home of generative matter, which before they did not, insomuch that they soon had a Brood of young in their Combs. Upon which the Gentleman perceiving that I was so exact in finding out the King-Bee, desired me to bring him another King-Bee out of some Hive out of the Country, which I did, & upon the 28th. of *Aug.* 1677. presented him to the King's Majesty with
about

about a score in His company for distinction, among which His Majesty immediately discern'd him, wonderfully different from the other Bees, according to the description of Bee-Masters.

Also though an whole Hive of Bees cannot breed without a King-Bee, yet I have good reason to believe that it is more than probable that one King-Bee alone (if he could outlive a winter) might breed Bees without the help of the common Bees ; and I am the more confirmed in this opinion, because we see the likest insect the male-wasp, that he makes his own Comb in his nest, and breeds all his young alone, lying in the midst of six or seven Cells, without the help of the common Wasps, until some are hatched, and then the Wasps breed faster, by having more heat among them; the male Wasp breeding thus alone, is the cause why we see so few of them abroad until the Summer be almost ended ; for the common sort of Wasps do all dye every Winter, but the male-wasps fly away and are not killed, as are the male-Bees, because they fly away, and so are not in a capacity of undermining that government which of it self must be shortly extinct, nature its self so wisely ordering the destruction of those vermine: for every male thus flying away, lives in some obscure place (being of a stronger constitution than Bees are) untill the next spring, and then every one that lives so long, makes a several nest where he can find a place. The King-Bee hath no need thus to breed alone, and take such pains to gather generative matter

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matter out of vegetables for the production of Bees, because he hath a multitude of Subjects, that do it at his command; and it is evident, that the great numbers and heat of the Bees much helps them to breed so fast in the Spring, that they have such multitudes before the Honey-Dews come; for we see in very poor stocks, and casts sometimes but an handful of Bees in all left, and yet they live and breed (having their King with them) but so slowly and so few for want of heat, that though they escape the robbers, yet cannot recover themselves to gather enough whilst Summer lasteth, to keep them in the Winter following.

As for my second reason, that the Honey Bees are not females by copulation or conception, but by supplying the place and office of the female.

Besides, what is abovesaid concerning the similitude of the male-Wasp supplying himself in the feminine office, I thus make it appear: if they did copulate with the King Bee (which is the only male) then of necessity they must (as other Insects do,) receive his sperm into their bodies, and so consequently lay prolifick Eggs (as the Silk-worm doth) into their several Cells: which they do not, as I could ever yet find or hear of any that ever did; therefore I conclude that it is not so.

But further, that place which receives Sperm, and retains it in order to propagation, is a matrix: and the several matrixes whereinto the King-Bee injects his sperm, none can deny but that they are all prepared and built by the

Hony-Bees which are these :

Each of those particular oblong pavillions at the Edges of the combs is a matrix for the production of the Royal Race of each King-Bee, because it receives and retains his sperm to that end: and each Cell in every ordinary Combe is a matrix to receive and retain his sperm for the production of each common Hony-Bee; and each Cell in the Drone-Comb (which Cells are larger and deeper than the Hony-Bees Cells are) is a matrix to receive and retain his seed for the production of each Drone-Bee.

Now, that which administers augmentation to sperm, so as to hatch up, or bring forth, may easily be supposed to be in the female; or that it is her part and office to do it. The *materia formabilis*, or corporaell part of the young Bee, is, that generative matter so plentifully brought in by the Hony-Bees on their thighs, and by them put into the Cells into which the sperm of the King-Bee is injected, and they supply the place and office of the female further by duly commixing the fore-mentioned generative matter with the sperm, according to the several sorts of Bees to be generated, whether a King-Bee, a common Hony-Bee, or a Drone-Bee, which being duly mixed in the Cell, and covered, resembles an Egg in the effect, though not altogether in the form, the sperm of the King-Bee and the generative matter collected by the Hony-Bees being therein united in order to production, by their constant heat administered to it, each Bee is produced.

As

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As for my third reason, that the Drone hath neither parts nor instruments for generation either as male or female. As male, I never yet could find any sperm in a Drone by defection, as I have found in a King-Bee; and whereas some suppose the Drone to have testicles because he hath an obtuse tayl; it is not so; for that part of him which they suppose to be testicles, is only the fleshy membranous substance of his obtuse form and tayl; but seeing Bees never use copulation, I know no reason why they should suppose that nature produced testicles in the Drone for no use; for males they cannot be, because the Bees cannot breed when they have Drones among them, if the King-Bee is wanting. As female, the Drone never works, because he hath no fangs, and so is incapable of doing the part of a female; for the Hony-Bees do most of their works for breeding with their fangs, for with them they gather nutritious or augmentative matter fit for generation of *fetus*: and with them likewise, they commix the aforesaid matter in the matrix of the Cell, with those active principles contained in the sperm of the King-Bee.

Thus their fangs are their instruments with which they in a great measure supply the part and office of the female; the Drone therefore cannot be a female, because as all men may plainly see he hath no fangs wherewith to work; but the most certain reason why the Drone is neither male nor female, is, because two or three, and sometimes, four generations

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of Bees are bred in many stocks before any Drones appear to be among them, which were impossible if the Drones were males or females.

Moreover, I have known several stocks of Bees to have bred and increased until Midsummer, without having any Drones among them.

Also the use and nature of the Drone shew that he is not necessary either as male, or female being produced by nature only for an help in a time of necessity; as I shall now shew,

The Drones when come to maturity, serve for no purpose but to lye at home close to the combs where the young brood is (their form being by nature produced such, for the same end) to help to hatch up the young brood as a Capon hatcheth the Eggs of an Hen by sitting on them; for what the Country woman doth by art (in pulling off the feathers from the Capons breast) to make him sit on the Eggs; the same is done by nature among the Bees in producing the Drones in such a form, and at such a time, as they have most need of them to sit close and help to hatch the young ones, which the Hony Bees need them not for, but can do it themselves untill the time that Hony-gathering comes; and therefore the Bees breed not their Drones so early in the spring, but as neer as they can, just before Hony-Dews fall; because they would have the use of them at as little charge of feeding them as they can, which use of them is, while the Hony-Bees are at their labours abroad in gathering Hony; for, as the Bees
by

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by instinct foresee a succeeding winter, and provide for it; so do they foresee the evil consequence that would attend their excessive industry under the temptation of Hony-Dews, which would certainly draw them out to such a degree as their young brood might perish at home for want of a suitable heat, were it not that nature had provided such a sort of Bees as are lazy, and shaped fit to lye at home, and in the others absence to hatch their young ones, and when they had served that turne, then to dye.

For, their natures are such, that they cannot endure the coldness of the season in *September*, but dye then of themselves, if spared so long by the Hony-Bees, but they are generally killed in *July*, and *August*, viz. a little before their own time of dying (because Hony-gathering being past, the Bees have no more need of them) to save that stored provision which those useless eaters would consume in that short time.

Also the Bees will not only be without Drones as long as they can; but when Hony-gathering comes late (to save their store) they pull them out of the Cells before they are ripe, whilst they are white; this they do whilst some are among them, lest they should suddenly want them: sometimes also they pull them out in like manner whilst Hony gathering lasts, to fill those Cells wherein they were with Hony: the reason of all is, because the Bees are thrifty, and know that they have them as vassals to serve their present need of them; an

example, of which you may easily try, by killing a Drone in crushing him at the mouth of any Hive, and the Hony-Bees will not be angry; but kill an Hony-Bee in the like manner and place, then presently the other Bees scenting it, will shew their anger by seeking revenge on you.

CHAP. III.

The Manner of the Generation of the King-Bee.

THose oblong pavillions, beforementioned on the edges of the Combs, are each matrix; and the common Hony-Bees extract from some particular Vegetables a peculiar and select animable matter, which they put into those matrixes, to which the King-Bee injects his sperm, and as soon as that is done, the cavity is filled up with more of the same matter, and duly mixed by the common Bees, who cover it over with wax. That select matter which fills up the vacuity of the matrix, being both nourishment and augmentation to the sperm of the King-Bee, as the meat in an Egg is to the Cocks tread, which produceth a Chick with the warmth of the Hens sitting; so in like manner this being kept in a constant heat by the warmth of the Bees lying close about it, in process of time produceth a King-Bee, with his form

and

and lineaments, which as soon as it comes to its vigour and perfection, opens his own way out.

CHAP. IV.

The Manner of the Generation of the Honey-Bees.

THE common Honey-Bees are thus produced: The matrixes are each particular Cell in the common Honey-Comb, among which the King-Bee walketh from one Cell to another, and as he walketh, he injecteth one seed into each Cell, in the manner as I have before described; begining close under the Honey which is towards the upper parts of the Hive, & so going on downwards in rows as low as the globulous body of the Bees doth reach, and from side to side in the same largeness of circumference as the globulous body of the Bees doth reach, and the King-Bees sperm being thus injected into each Cell after the Honey-Bees have first put in some generative matter, by degrees as he injects his seed one by one, so by degrees the Honey-Bees fill up those Cells one after another; and when the matrix or Cell is thus filled up with this generative matter, the Honey-Bees (by instinct) mix the aforesaid matter with his sperm, also using water withall for the more convenient

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moisture and due mixture of it; then this being finished, they cover over each Cell with wax: the generative matter collected & lodged in the Cells by the Hony-Bees being designed by nature for nutrition to, and augmentation of, the sperm of the King-Bee, as is recited by the Egg; and those matrixes being kept in a constant heat by the Bees, in process of time converts that sperm and matter so mixed, first into a maggot, with its full magnitude, which soon converts into an Hony-Bee, which opens its own way out; for the matrix being stopped close up, and covered with wax at the first mixture of the sperm, and the aforesaid generative matter, that waxen cover is not opened untill the Bee it self opens its own way out.

CHAP. V.

*The Manner of the Generation
of the Drone-Bees.*

ONE vulgar Error concerning the Generation of the Drone-Bee is, that a common Hony-Bee when he loseth his sting, then degenerates into a Drone: which if so, would be a contradiction in nature; because it is not possible for any creature by the loss of its entrails to grow bigger, but dye; for with his sting an Hony-Bee loseth his entrails also.

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also. And, experience plainly shews, that the Drones are bred in their Hive, and in their full magnitude; Thus,

The Drones are generated with the sperm of the King-Bee, and the forementioned animable matter brought in by the common Hony-Bees after the very same manner as the Hony-Bees are, but with a different animable or generative matter, and in a different matrix, there being in every Hive one or more Drone Combs made by the Hony-Bees with larger and deeper Cells for that very purpose, each Cell being composed exactly proportionable to the full magnitude of a Drone-Bee, which may be easily experienced by any one in observing the differences of the Combs in any Hive; but that the Drones are bred in their full magnitude is best seen in *May*, or *June*, by taking part of the Drone-Comb out of an Hive of Bees, for then any one may plainly see the Drone to be as large, having the exact form and parts of a Drone-Bee whilst he is white, before he comes to full maturity, as he hath afterwards when ripe and fled: being bred without fangs as well as without a sting; the Drones when come to maturity, thrust off their waxen covers with their heads.

CHAP. VI.

The first Question answered.

Quest. **W**Hat mean you by generative, animable, or organizable matter?

Ans. By generative, organizable, or animable matter, so often mentioned, I mean that peculiar and selected matter which being of divers sorts, is by every colony and stock of Bees so plentifully carryed into the Hive, all the spring and Summer time, which matter the Bees fasten on their thighs for conveniency of carriage, and they gather it with their fangs off of almost all sorts of vegetables: as trees, plants, Flowers, &c. which generative matter by the plastick power, and active quality residing in the sperm of the King-Bee is made use of for the augmentation of the severall parts of the *Fetus*.

Many persons when they see the Bees laden with this generative matter, think it to be wax, and others think it to be Bee Bread, or food for the Bees to eat, although it is neither the one nor the other, but only that matter which makes the corporeal part of each Bee; and whether the Hony-Bees gather it as it is, or whether in their gathering and mixing of it they add any feminine vertue to it or not, I will not certainly determine; but this I know, that this generative matter thus by them collected

§.3. *Of the Generation of Bees.* 59

collected and put into the Cells, and also duly mixed with the sperm of the King-Bee and stopped up, produceth each Bee, and the same generative matter without the sperm of the King Bee therewith duly mixed, produceth not a Bee, which is plainly proved, by so much of that generative matter stopping up severall Cells in divers Combs in many Hives, but especially old stocks into which Cells the King-Bee happened to miss injecting his sperm; for in case of the want of the King-Bee's sperm among this generative matter, as when he misseeth a Cell, or injecteth twice in the next, this matter, though in the Cell and stopped, yet never animates, but abides still stopping up those Cells whereinto it is put, which matter so inanimated; and stopping up the Cells, is called by some Sandarack, by others Bee-bread.

This generative matter (whether it abides stopping up the Cells, or whether it is animated, having the sperm of the King-Bee mixed with it, or not) that it is not Bee-bread I conclude, because Bees that can fly eat not of it, for I have seen much of it among the Combs of such stocks as have dyed through overswarming themselves; the Bees of which stocks would not have been starved for want of food if they could have eaten this matter. Also when a stock is robbed, you may find this generative matter in some of the Cells, which the robbers would carry away as well as the Hony, if it were food.

Also, the young Bees in embryo, and afterwards

wards when they are Maggots, cannot possibly feed of it any otherwise than the Chick in an Egg doth, for they are alwayes kept close stopt up with their waxen cover from the time of the first mixture of this generative matter with the King-Bee's sperm, until the Bee opens his own way out, which any man who listeth may experience by taking a Comb out of an Hive of Bees in the spring when first the Bees begin to breed.

The reason why there is so much of this matter stopping up the Cells in the Combs (especially in old stocks) is because the King-Bee sometimes misseth injecting his sperm into every matrix or Cell as he walketh, and so this generative matter for want of his sperm (though ordered by the Hony-Bees, yet) never animates but abides in the matrix or Cell, because the Bees cannot get it out.

That this generative matter is not wax, the colour distinguisheth; for wax is pure & white, when the Bees gather it, otherwise by washing and cleansing it only, we could not make yellow wax, so white as wee see our white wax is though made of yellow wax; but to make white wax yellow, or any other colour, it cannot be done, but by addition of somewhat else to it, except by age; for it is the age of the Combs, together with the contiguity of the generative matter, and the heat of the Bees that changes the colour of the wax in the Hive, and turnes it from white to yellow, and sometimes reddish, and almost blackish.

But this generative matter, when the Bees
gather

§ 3. *Of the Generation of Bees.* 61

gather it, is of all colours, according to the several colours of the vegetables, from which the Bees gather it; as orange, reddish, yellow, sad colours, and the like.

Also any man may easily convince himself that it is not wax by taking a little of it off the Bees thigh, and holding it to the fire; for the wax will then melt, but the generative matter will crumble or grow hard with the heat; and further, we see that all old stocks gather of this matter plentifully, when their Hives were quite filled with Combs some years before, so that they can dispose of no more wax in the Hive than what covers the Cells of the Combs; and swarms carry in very little or none of this matter untill after their Combs are built, and they begin to breed young.

CHAP. VII.

The Second Question answered.

Quest. **H**OW comes it to pass, if the King-Bee is a Male, and the only Male in every Colony and Hive of Bees, that he by his only Sperm producesh not only King-Bees like himself (which may easily be granted) but also common Honey-Bees with stings, and Drones without stings, both Different sorts, and neither

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neither of them like himself, nor like one another?

Ans. First; his seed being the Principle of life; in it is that *ens sine quo non* of all the Bees, or thus; in that Sperme lies that vertue without which no Bee can be bred, and that it produceth those several sorts of Bees; it is from the maternal part of the Bees, which is the greater in quantity as is both the yelk and the white of the Egg to the Cocks tread, which alterative vertue lies in the several sorts of generative matter by instinct gathered from those several sorts of vegetables from which they gather it, which being by the Bees duly gathered and mixed, have such vertue as to conduce to the end of the several forms & distinct natures of each Bee; and generative quality of the matter, not losing, but rather increasing its vertue by their gathering of it, and afterwards by their due mixing of it, and constant heat administred to it.

I answer, Secondly, That those several sorts of Bees are produced from the King-Bee's Sperme only, by reason of that instinct given to the Honey-Bees to prepare different Matrixes to receive and retain his Sperme, and different sorts of generative matter to commix with his Sperme, which produces those several sorts of Bees: as we see by this example following, *viz.* That an Hee-Ass (by the help of different matrixes) begets a Mule and an Ass; so also one sort of Doggs meeting with various receptacles, do beget abundance of Doggs of another and different sort from themselves.

CHAP.

CHAP. VIII.

The Third Question answered.

Quest. **I**F Bees have room enough, and are not killed, as in Colonies, will they not increase to such prodigious numbers, that there will be too many?

Ans. That it is not possible to have too great numbers of Honey-Bees in a Colony (if there happen to be too many Drones, they may be easily killed, by lessening the room, for then the Honey-Bees will kill them) because the King Bee can lay his sperm but in such a circumference, and therefore the Bees in Straw-Hives are so straitned for lack of room, because the King Bee must have room to lay his sperm, and thence wanting room to lay Honey in; for a remedy they are forced to swarm, and so dis-joyn their labours, which are united in the Colony; and for this cause, Bees kept in Colonies are alwaies stronger, and more in numbers than those kept in Straw-Hives, and yet are not too many; for the more Bees alwaies produce the more Honey; and I have often seen, that three pecks of Bees in one Hive have gathered more Honey in one year, than a bushel of Bees hath in two Hives.

CHAP.

CHAP. IX.

The fourth Question Answered.

Quest. **W**hich is right Virgin-Honey? for if wee suppose that swarms and casts only do produce Virgin Hony, then Stocks and colonyes (which must needs be old because they dye not) will yield none.

Ans. The ignorance of many Country people not knowing which is right Virgin-Hony, and which is not, is the cause that there is so little right to be had; for they generally think that all the Hony which comes from a swarm and cast, is Virgin-Hony; and that there is none in Stocks, when the truth is not so; for a young Stock hath Virgin-Hony as well as course Hony; and the Honey in a swarm or cast is often made as course as some in Stocks for want of due separation, because they also may have course Honey as well as fine.

To know which is right Virgin-Honey, you must consider that the generative matter and sperm duly mixed in each particular matrix or Cell, produceth a Bee, and every Bee that is bred leaveth a little drossy substance, sticking to the wax in the Cell from whence he came, which makes the Cell foul; and the more Bees are bred in a Cell, the more filth is contracted in that Cell, until in time some combs will be quite black; this filth infecting the Honey (afterwards put into such Cells, and abiding therein

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therein) with dross. Another cause of course Honey is, when this generative matter is put into any Cell, and the King Bee happens to miss, injecting his sperm thereinto, then that Cell abides so stopt; and for want of his sperm among the generative matter, it never animates, nor is converted to any form, but abides still, stopping up the Cell; and this matter (called by some Bee bread) being among the Honey, is not easily separated; and this generative matter so stopping up some Cells, together with the young grubs carelessly suffered among the Honey, makes most of it so court as it is. For when Honey-gathering is plentiful, the Bees fill those Cells first which are empty and uppermost, and so they come down lower and lower with their Brood and Honey, as fast as the young Bees empty their Cells by opening their way out, in order to their flying abroad, and so leave that generative matter among their Honey above, because it growing hard they cannot easily get it out.

Now as those are Virgins in nature which never knew male, or brought forth young, so those only are right Virgin Cells among the Combs in which never any Bee was bred, nor any sperm injected by the King-Bee, nor any generative matter layd and put in by the Honey-Bees, and consequently that Honey which is put into those Virgin Cells, and kept separated from the other Honey in those foul Cells where Bees have been bred, is right Virgin Honey and no other.

And if this Virgin Honey be not separated,

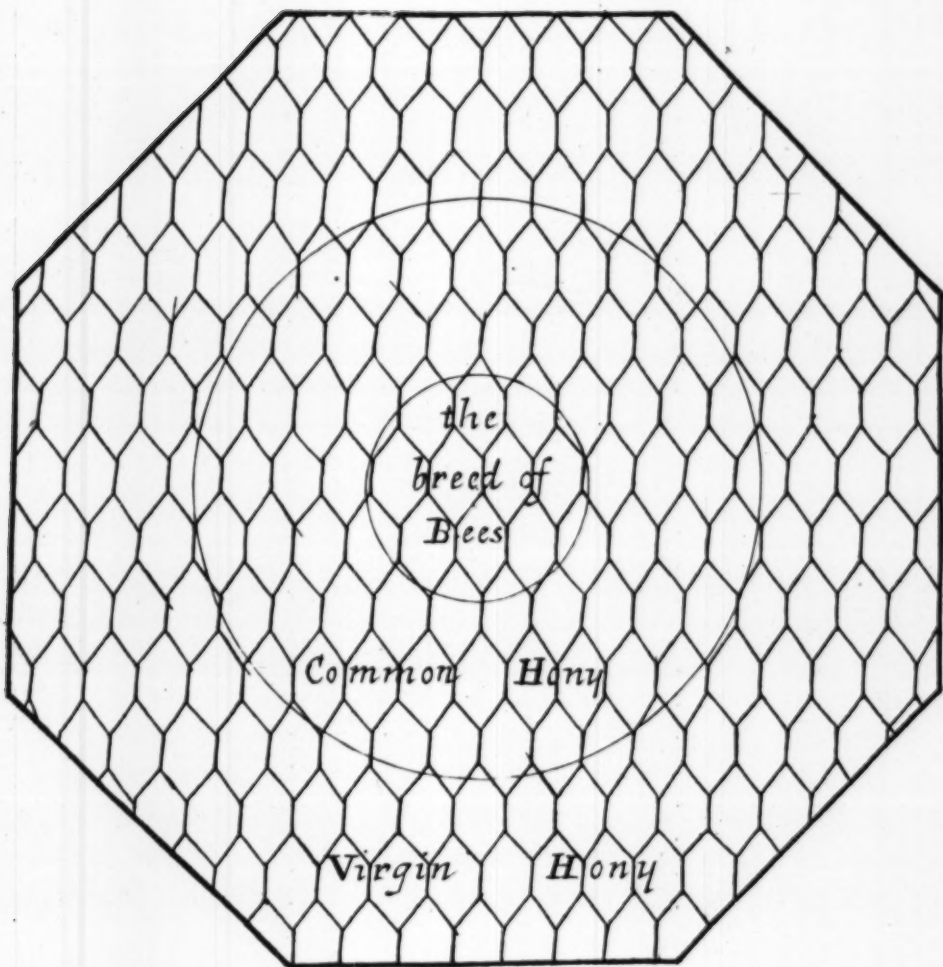
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cut off, and divided from the other part of the Comb wherein Bees have been bred, but suffered to run out altogether, then the common Honey in those Cells wherein Bees have been bred, makes the true Virgin-Honey courser; for, swarms and casts breed young Bees as well as old stocks; so that for want of this care in separation, the Honey taken from a swarm may be sometimes as coarse as some in stocks.

And herein the keeping of Bees in Colonies hath much the advantage of the old method in straw-Hives; because the Combs never wax old, and the Virgin-Honey is easier seen and separated from the other; besides, the Bees delighting in cleanliness, are not offended with their Combs, as it often happens in the old method by reason of that quantity of generative matter stopping up many Cells in old stocks; for it is only the age of the Combs which makes a stock of Bees old, and not the age of the Bees themselves; the Bees in a swarm being as old as the Bees in a stock that hath stood ten years together; the reason is, because the old Bees goe forth in a swarm for directions, and the young Bees stay behind for strength and defence; besides, the Bees breed and die apace, and so succeed one another; but the age of the Bees themselves is no damage to the stock, because they work as long as they live, though it be three or four years, and never leave off working as long as they are able to fly; and for one Bee that dies with age, six will die by accidents of bad weather. A Colonie
need





Heard

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need never be above two years old if they stand but in an indifferent place. I my self have several Colonies to be seen by any that desire it, not far from *London*, which have stood above four years, from which I have yearly taken off Honey, and yet the Combs now are of the same age as a this years swarm in *May* viz. now just three months old.

CHAP. X.

Of a Stock of Bees and how to Order them in Straw-Hives.

A Stock of Bees is a company of Bees consisting of three sorts before described, viz. A King-Bee, great numbers of common Honey-Bees, and some Drone-Bees: being called a Stock of Bees because they are a company congregated within themselves, and subsisting upon their own Stock, having gotten by their own labour & industry a competent measure of food to maintain them the whole Winter and (while they can gather none) until the next Summer, and also a competent number of Bees to preserve themselves and keep one another warm in cold weather. For, as I take it, every industrious man may be said to live on his Stock while he cannot exercise his function, and thereby is forced to live upon his acquired Stock six Months together

F 2

gether or until the return of a better season.

Thus a swarm in *May*, or *June* is called a Stock at *Michaelmas*. And thus every company of Bees, though in a Tree or cieling of an House, may be called a Stock of Bees; but the ordinary Hives or Houses in which Bees are preserved and attended, are made of Straw, from whence the Country man and such as content themselves with what is easy and cheap, do gather the profit they look for from the labour of the Bees. I do therefore to such, give only the instructions following; which contain all that can be well directed in the use of Straw-Hives; and I shall afterwards shew the difference between those usual receptacles of Bees, and the Houses and Boxes which have been lately invented and improved under the name of Colonies; which do not only raise a greater conveniency and benefit to the Master, but give him the pleasure and the entertainment of seeing the Bees work, and in what condition his Colonies are from time to time.

The instructions for the ordering of Bees in Straw-Hives I shall briefly shew according to the several seasons of the Year, beginning in *February*, and ending with *October*, because all the Winter from *October* to *February*, they are best stopped close up, except only a mouth passage for air; observing in general, that according as the Spring is forward or late, so sooner or later are the Bees to be ordered; remembering also all the Year long to

keep

§ 3. *Of the Generation of Bees.* 69

Keep the Hive close stopped up so that the Bees may have no passage out or into their Hive any where but at the Mouth only. The best stopping for them is Morter or Lome, mixed and tempered with ashes, and ashes sprinkled round over it, and on the top of the Hive, especially under the hackle or straw cover.

In *February* as soon as the weather and spring permits, let your Bees have their winter mouth cleared so as the Bees may not be obstructed in flying out and in; for in this month the strong stocks will begin to work.

In *March* open the mouth of your Straw-Hives a little according to the quantity of Bees in each Hive, and in the evenings once or twice in the month lift them off from the stool or place whereon they stand, and make clean the stool or floor of their Hive, by sweeping away what filth may be there contracted in the winter. In this month also begin to feed where need is.

In *April*, open their passage wider according to their strength, and in the evening two or three times this month, according as you find your Bees in strength (for weak stocks require more attendance and care to look after them than strong stocks.) Turn up the Hive and look into it, and cut away all those Combs which are dry or crumbling, or have any filth resembling small cobwebs in them; and if you have any old stocks that thrive not well, cut away their black Combs in the middle part of their Hive neer half way from the bottom

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of their Hive. For the keeping the Bees thus clean and free from dust and vermin, as moths Maggots &c. doth very much incourage them, and ease them of much labour, especially in the spring, until their Hives are filled with Bees. Also continue to feed such poor stocks as have need.

In *May* and *June* let your Bees have doore room enough that they may not be too much crouded. Also attend and expect your Bees to swarm.

Concerning the swarming of Bees I have already treated in the second Section; therefore shall be here very brief. You may in part know when your Bees will swarm, which is soon after they are filled with Bees, and fitted. But the sooner to enable them to be filled and fitted, and consequently to swarm, I advise to keep them with as great numbers of Bees as you can, in order to which I advise you to use no Hives that hold less than three pecks: The best size is something above. Also I advise casts and second swarms to be all put back again to their own Hives from whence they came, for seldom any of them come to good, unless two or three of them are united. And besides they do more hurt and damage to the stock out of which they came, than they themselves are worth when kept. And if they rise two or three times, put them as often back again to their old Hive on the same manner as the Bees are put to their Colonies when taken off, which I shall describe in the 16th chapter ensuing. And if you take their King-Bee from among

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amongst them (which then may be done as in the same 16th Chapter ensuing is shewed) they will not then be so apt to rise again. The reason why I advise second swarms to be thus put back again, is because the stock will then be much the better in the next Spring, because it will be both stronger in Bees, and richer than it could possibly have been if the second Swarm had been kept from it, and consequently be the sooner filled with Bees, and fitted to swarm the next year, by this means also you may avoid the having any poor Stocks, unless only in very bad years, or when they over-swarm themselves.

When your Bees are swarmed, Hive them into an Hive so dressed as I shall direct in the 9th. Chapter ensuing, and set them the same night where you intend they shall stand.

In *July*, narrow their passage, and poize them to know their state, and likewise beware of robbers, especially after the middle of the month.

In *August*, make their passage narrower, as I shall direct in the 19th Chapter of the next Section concerning robbing. Likewise take up all such as you find either very heavy, or very light; I mean such as are very full of Honey and have but few Bees, and such as have not probably a sufficient quantity of Honey to subsist ontill the next Summer.

Concerning the robbing of Bees, which is chiefly in this Month, I shall treat of it in a Chapter by its self, *viz.* the 19th. Chapter ensuing.

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In *September* is the best time to feed such Bees as you intend to keep, and think that they have not a sufficient store of their own.

This month also, and the next are very good times to remove Bees.

In *October* look well to their winter quarters, that cold, wet, and vermin, offend not, nor destroy them. As for their stopping up, I refer you to the 19th *Chapter* ensuing; and as for their diseases, or accidents, I refer you to the 20th *Chapter* ensuing.

The differences of keeping the Bees in straw-Hives, and Colonies, are negatively; not in any change in the natures of the Bees themselves, nor in their government: but affirmatively.

First, In their breeding as to the form; which I shall shew in the 15th. *Chapter* ensuing.

Secondly; In their strength, because of their greater numbers; and.

Thirdly; In their riches, by reason of their union.

Fourthly; Both in their strength and riches, because none of the Bees are killed.

Fifthly; In their profit, which is really more than double, (as I shall prove in the last *Chapter* of this Book) by reason of their being well ordered; as this Book directs.

Sixthly; In their safety, (as I shall shew in the 20th. and 21th. *Chapters* of the next Section) because they are better preserved from their enemies, and occasions of their

Lastly;

§ 3. *Of the Generation of Bees.* 73

Lastly ; In the goodness as well as in the quantity of Honey taken from them, being almost all Virgin-Honey.

All which, with the continued advantage of yearly profit, without the cruell destruction of so good servants, and without further expence, and without continual attendance all the time of swarming, will quickly recompence the charges of setting them up in Colonies.

But more clearly to evince the verity of what I have herein asserted, as well concerning the profit and advantage of the Colonies, as the goodness of the Honey, I shall (as long as I live) every year keep by me some of my box-Hives, which I yearly take off my Colonies, to be seen by any that shall desire it, that will but take the pains to come to my dwelling-house, being an Apothecary's shop in the Bowling-Ally in *Westminster* (as is before-mentioned in the preface.) The time I shall keep those Colonies (so taken off every year) to be seen, will be two whole months, *viz.* from the first day of *August*, until the last day of *September* ; for the Honey will not keep good much longer because of some grubs in the Hive.

Also I intend constantly to keep by me some store of right fine Virgin-Honey wherewith to furnish any who are so exact and curious as to have the right and best so separated from the course-Honey, as it ought to be, because whoever sends to me for it may not be disappointed, but have that which is true and right.

To

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To conclude this section; I intend also to have all the month of *September* right Virgin-Honey in the Combs of the same sort of that Comb which I presented to His Majesty at Dinner in *White-hall* in *October* last, which was eight Inches long, and five Inches broad, to furnish any who desire to see such curious works, or tast such pleasant food which is the true Nectar, and rightly called heavenly food, because it comes from Heaven in an Honey-Dew, though the heathen report it to be the food of the Gods, because *Jupiter* being fed by Bees, must needs eat Honey: which he liked so well, that afterwards the Bees were made the Muses Birds.

Section

Section 4.

Of Ordering the Colonies.

CHAP. I.

Some general things, by way of Advice, to be observed by all those who already have, or intend to keep Bees in Colonies.

I. **T**HAT Bees are indocible creatures, and therefore their own natures must be observed and followed so that they may be lead (as they are in this method) to improve their industrious labours double to their owners advantage; therefore they who keep Bees thus should be very exact in observing the following directions in this Book, which are written upon large experience.

I I. That they set their Bees in the Bee-house to furnish their houses with Colonies as soon in the spring as they can; for by how much the sooner in the Spring they are put into the house, by so much the better the Bees will be acquainted with their new station. Therefore, next to the Spring, the best time to furnish your Bee-house with good stocks, is in the fall, and then they will be the more ready against the next Spring. And if the Spring be
far

far spent. I advise to furnish your house with early and large swarms as I shall shew in this Book.

III That although Bees do not swarm in this method, yet if any man hath a mind to have an increase, he may let them swarm (for the Colony as well as a Straw-Hive will swarm if you forbear to raise them) which must be when you intend to forbear taking off an upper-box that year, as I shall shew in the 18th Chapter of this Section,

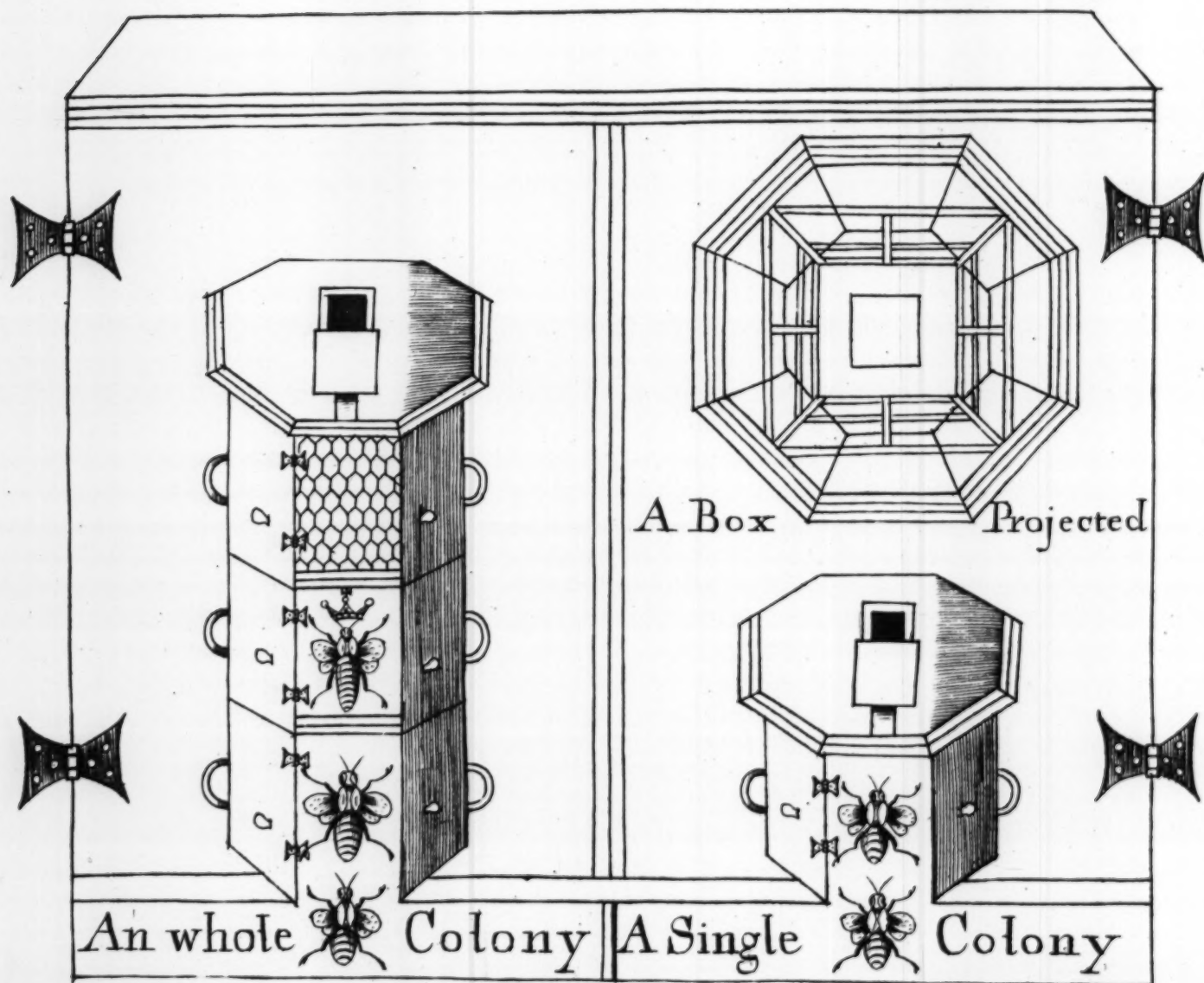
I V. That whosoever sets up this method, do first see a Bee-house made according to the pattern of His Majesty's Bee-house in the Royal Garden : which is so exactly made according to the natures of the Bees, as to guide the Bees without any hindrance into their Hives ; otherwise there may easily happen mistakes in the manner thereof, especially in the front doors; and the ledg at the bottom, as some have found to their own loss. And whereas there are several Bee-houses in divers County's made according to that exact form, I shall direct those that come or send to me where they may see them.

V. That they have examples of those Hives I have last made, and had good experience in; otherwise mistakes may happen and hazard the thriving of their Colonies; because many Hives formerly made, have not been made right, but disadvantageous to the Bees in their working divers wayes, which disadvantages are all removed and amended in those Hives I now use and advise others to,
being

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Colonial Signet



being so much better than those formerly made, and differing from them in six or seven places of the Hive; as in the passages out of one Hive into another, in the little door on the side which is better left out, and in the sliding shutter, and in the creases at the top and bottom of the Hive, in the windows, in the entrance of the Bees into and out of the Hive, and in the height of them. All these mistakes about the form of the Hives have happened, because most of them were made by false patterns of such who were not experienced in the use of them. And for remedy thereof I keep constantly some by me, ready made and fixed, to furnish any who desire them, at my house aforesaid (in the preface) in the Bowling ally in *Westminster*.

CHAP. II.

The Description of a Bee-House.

BEfore we come to order the Colonies of Bees that so we may enjoy the Fruits of their labours without killing the Bees themselves; I think it best to give a general description of the Bee-house, of the boxes or Box-hives, and of the method of ordering the Bees and Colonies. I shall describe only an house for four Colonies of Bees which is the most convenient, by which according to the several

several dimensions and proportions a workman may contrive an house for two or three or six, or eight. The house for four Colonies is thus.

The length from outside to outside ten foot, the breadth from outside to outside two foot and a half: The house may be made with any boards, and you may make it with small posts in the corners.

Let the floor be made strong, close, and even. And the house made to stand so strong that the wind blow it not down; a good way to make it stand fast is to fasten four sparrs to the four corner feet of the house, having driven them first a pretty way into the ground.

Let the floor be a foot or better from the ground.

The distance from the floor to the plates four foot.

The front doors three foot and an half high, with a board over to reach to the plates, under which board the doors may shut close, and an upright in the middle for the two front doors to shut close against in a ravel.

Let there be a ledge one inch and quarter thick, and two inches broad to be nailed fast down under the front doors, with a ravel in it for the doors to shut over. Underneath through this ledge are to be cut, at equall distances, four holes, halfe an inch high, and five inches long, for the Bees to go in and out under the doors through those cutt holes into the box-hive, and not into the house. For the mouth of the box-hive is to stand close to, and

answer

§ 4. *Of Ordering the Colonies.* 79

answer that hole or entrance so cut in the ledge, and let the bottom of the front doors be even to shut close in the ravel made in the upper part of the ledge.

You may let the floor reach four inches without the front doors, for the Bees to alight and rest upon, and plain it sloping from the ledge to the edg, that the rain may fall off on the ground.

Let the back doors be as high as the roof will well suffer them, but as large as to take out a Colony when need is.

The house may be covered with any thing to keep out wet; the best way is to make the roof so that the rain may not drop off on the Bees coming home. If you make it with rafters for the rain to fall both wayes, then nail a ledge sloping upon the front to carry the water so that it may fall at the ends of the house.

Make your house so close and tite that it may very well keep out cold, wett, and vermine. And let the front stand as neer as you can to the South, or a very little bending to the West, and place it so that you may open the back doors with ease.

The house thus made and placed hath this happy advantage, that it keeps the Bees warm in the dead of winter, so that the most violent frosts do not destroy the Bees; especially if you cover the boxes in the house with loose Straw or hay. And in the spring by reason of the front doors standing always to the South Sun, they receive all the impressions of the warmth

warmth of that Sun, and it keeps off the fierce *March* winds (which are commonly North and East) from dissipating the impressions of the aforesaid heat of the Sun in the house, like a Melon-glass. As also it keeps in the natural heat of the Bees, which affects the house with warmth, which heat, together with the impressions of the Sun upon the foredoors, is so preserved by the closeness of the house, that after a cold frosty night in *march* or *April*, open but a back-door, and put in your head, & you shall find it warm as a Stove, and consequently by its continual heat hastens the hatch of the young brood of Bees. And in Summer, by opening the back-doors there comes in a fresh Air that dissipates the excessive heat in the house; and consequently all results in this, that the house keeps them warm, when the weather is too cold, and keeps them cool, when the weather is too hot.

CHAP. III.

The Description of the Boxes, or Box-Hives.

THE Boxes, or Box-Hives may be made with any boards, but firr is best, because it being spongy, receives and sucks up the breath of the Bees in the cold weather, which breath is not sucked up by Oaken Hives, and then

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then it abides on the inside in cold weather, and so affects the Hive with coldness, which may be avoided by making the Hives with deal or firr boards.

The form is octagon or eight square, which being near to roundness, is much better than to have them four square, because the Bees lying in a globulous body in the center of the Hive, are thereby the neerer to the circumference in this form as well as in round Hives, but in four square Hives they would be more remote from the corners, and the consequence would be that the Honey in the corners would candy and thereby become useles for the Bees in the Spring, which in this form is avoided by their propinquity to it, whose naturall heat keeps the Honey from being candied or curdled, in the Hive.

The height of the Hives is ten inches from the top to the bottom on the out side, and sixteen inches over from outside to outside with a sliding shutter to run easily in a groove in the middle of the top, backwards over the back window; this shutter is to cover an hole five inches square in the middle of the top of the Hive, also in the Hive are two large glass windowes, one before, the other behind, with doors to cover the glasses. And two handles, on each side one, for lifting them up; a small passage a little above halfe an inch high under the glass window in the front, for the Bees to goe in and out at, as at a door: also a frame in the inside made fast with four pins for the



Bees

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Bees to fasten their combs upon. But I advise all persons to refrain making of them without a true pattern, especially whilst they may have them at the Authors house (mentioned in the preface) at as reasonable rates as any where else (except their carriage) or at least they may be informed by him where such Hives are, as be made right.

CHAP. IV.

*The Method of Ordering the Bees
and Colonies.*

THE Box-Hive being placed in the house with the sliding shutter open, and a good stock of Bees placed on the top: this sliding shutter is left open for a line of communication, because the Bees have no other passage but through the Box to go out and in at the bottom, and that they may fill the said box as part of their Hive without swarming, which when they have performed in a great measure, another Box is to be put under them with the shutter open, and when that is pretty well filled according to the manner and season hereafter mentioned, to shut the sliding shutter that is next under the upper Hive or box and so take off the uppermost at the time hereafter mentioned, and never after to use any Straw-Hive again; and when

the

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the lower Box of the two that are left, is so full as to endanger swarming, then put a third under; and according to following directions take off the uppermost, so that thus you have a circulation by three Boxes, of a perpetual vacuity to prevent swarming, and a perpetual taking away of Honey without the Bees destruction, for what Bees may be in the upper box when taken away, will, when discharged repair to the mouth of the Colony from whence they were taken (being their old passage) and so are preserved. Some few persons disaffected to any invention found out in the age they live in, have cast some blots on this method because some who kept colonies suffered them to miscarry through mismanagement, and mistakes in the forms of the Bee-House and boxes, which mistakes are mentioned in the first Chapter of this fourth Section and may be avoided chiefly by the boxes being made right, and wholly by the house with the ledge made right, for the guiding the Bees into their Hives: And the mismanagement may be avoided by a carefull following the directions this Book will afford; for many persons who have already taken my directions which follow, and were carefull to observe them, whose houses and Box-Hives were right made, their Colonies did, and still do thrive to admiration, as hath already appeared, and will further appear by the great increase of Honey which they yield every year: which any Gentleman may see, that will but take the pains to come to my

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house

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house, any time from the begining of *August* untill *Michaelmas*; for all that time I intend every year to keep some of those Box-Hives which I yearly take off my colonies to be seen (as I mentioned page 53. of this book) that by the sight of them, all persons willing may be fully satisfied not only of the profit in this method beyond what can be in the old method of Straw-Hives, but also of the admirable workmanship of the Bees which is very delightful to behold.

CHAP. V.

How to order the Bee-house.

AN house is absolutely necessary in this Art, without which it is in vain to begin with the method of colonies; for the sun shining on the Box-Hives hath more influence, and causeth greater heat in the inside than it doth shining on a Straw-Hive, because the Straw-Hive is more porous. However Straw-Hives are not so fit for colonies, because in time, they will yield one way or other, so that the combs which cannot be so strongly fixed in Straw-Hives as Box-Hives, will become pliable and bending, so as in the taking off the Upper-Hive they may be thrust together; and if so, the King-Bee as well as any other Bees, in either of the Hives may

soon

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soon be bruised or crushed to death. Therefore are the Hives made with whole Deal, and for the cause aforesaid, viz. the suns influence, the foredoors must be so kept shut as the following directions do shew.

But if some will be so frugal, an house may be made from a wall like a penthouse without any back doors; the greatest detriment will be, that their owners cannot so well see to inspect their Bees behind, if the house be made from a wall, then let there be doors at the ends as well as before which will supply the want of them behind in a great measure, being to be opened as the back doors of another house are, and let the roof come further over; so far as the rain that falls may not fall upon the board where the Bees alight, and let the floor be so much broader than the other that a man may walk behind the Colonies, the better to inspect the Bees, and to drive the sliding shutter home, when their Honey is to be taken. You may let the floor be four or five-foot broad from the wall to the outside of the front-doors, this house will be as well thatched as tyled, the front-doors must be made just as those in the house before described.

In ordering the Bee-House remember constantly to keep the fore-doors shut as well in Summer as in winter, and as well in the day time as in the night; for they must be always kept close shut, except only at such times and whilst you inspect your Bees, or put Boxes under, or take away a Box, or clean the house,

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but no longer at any time than needs must, especially whilst the Bees are at their work.

For, if the fore-doors are left constantly open in the Summer, the Sun shining hot upon them will melt their Combs and make the Bees dislike their Hives and swarm, or make their Combs only in the back parts of their Hives: And if the fore-doors be kept shut at some times only, and at other times left open, the Bees will not readily find their way, which will very much hinder their working, and also cause the Bees of severall Colonies meeting so neer home to fight and kill one another. All which are prevented by keeping the fore-doors alwayes shut close, except only as above excepted.

the Also back doors in the heat of the day in hot weather are to be opened to let in the cool Air, which will refresh the Bees, and at other times keep them also shut, except at any time for inspection. By these means you keep off the Scorching heat in Summer, and the violent cold in winter, and in the spring, the heat of the Sun shining on the fore-doors together with the steam and warmth of the Colonies in so close an house, exceedingly hastens their breeding, as glasses ripens melons.

CHAP. VI.

*What Bees to furnish the House withal
for Colonies.*

TO furnish the Bee-house with Colonies; take the best Bees you can get, that is such as are in very good case, which are best known by the weight of them, and by the great numbers of Bees, and the fulness of the Hive with them: there is little other difference among stocks of Bees. If you put light stocks into the house, they will not be fitt to be set up upon a Box-hive in one whole year; and if so, you had as good not put them into the house; besides, such are in danger to be robbed by reason of their paucity of Bees, therefore put into your Bee-house only heavy stocks, and such as are also full of Bees; for such stocks only, are fit to make Colonies, and will not deceive your expectation in their working into the Box-hives when they are raised and put on them, according to following directions.

CHAP. VII.

How to furnish the House with Bees.

HAVING provided good Bees, put them into your house, with the old mouth of the Hive against the place where the Bees entrance is into the house; and if you know not which is the mouth of the Hive, then look into it, and place the edges of the Combs North and South, and place the Hive so close as to touch the ledge where their entrance is to be, then stop up the Hive with Lome close round about, except their passage but especially the sides of their passage, so that no Bees may go out into the house, or any other way out or into the Hive but through that hole cut under the ledge of the front door, which is alwayes to be the month of the Colony: You must place the Straw-hive thus into the house upon the floor without any Box-Hive under it, because the Bees must be well acquainted with their way into and out of their Hive before they are to be raised up, and set upon a Box-Hive, for, whilst the Bees are weak, or feeble for want of numbers, and untill the Straw-hive be full of Bees, the setting them up upon a Box-hive not only gives them much unnecessary labour, but also exposes them to robbing, besides, many of the Bees will lose themselves because unacquainted with their new station.

CHAP.

CHAP. VIII.

When to furnish the House with Bees.

THE times when these Stocks are to be thus placed into the Bee-house, are in the Spring and fall : the best and fittest times are in the Spring till *Aprill* if the year be forward, and untill the end of *Aprill* when the year is backward ; and in the fall from the beginning of *September* ; until the end of *November*, if it be not frosty or snowy weather : the winter is indifferent, when the weather is neither frosty nor Snowy ; but in *May*, *June*, or *July*, if Bees are removed, their working is hindered to great loss, because most of the Bees will resort to the place from whence they were brought. And if Bees are removed in *August*, especially in the beginning of the month they will be in very great danger of being robbed ; and although I can remove them my self in *May* or *June*, or any time before they have swarmed, with very little or no damage to them by taking a little more time to do it in : yet, unless you have so much Judgment in Bees as to hinder their resort to the place from whence they were brought, I advise not to remove a Stock after the middle of *April* at the latest into the Bee-House, lest you thereby not only endamage them in their working, but also endanger

endanger the loss of many Bees which will make them feeble, so that to prevent your Bees from miscarrying, I advise if you have them not ready to be put into the house before the middle of *April*, then to wait for a good swarm in *May* (neer *London*) or *June* (further off in the Country) and so furnish your house with a swarm hived into a Box-Hive, and if a good swarm be not to be had according to the directions in the next Chapter, then wait untill the end of *August* for a good Stock, which I advise you to place into your house in the fall according to the directions given before, and let it stand so alone all the winter without any Box-Hive; for a good strong Stock placed into the house at any time in the fall after *August* is expired, or early in the spring before the Bees work apace, is better to furnish a Colony withall than a swarm, because such a Stock will fill one Box-Hive the first year, and if it be a very good Stock, and a very good Hony year, you may have a second Box put under, and the Straw-Hive taken off the same year, as I have had some.

CHAP. IX.

*How to order a Swarm to furnish
a Colony.*

THE Box-Hive whereinto you intend to put a good swarm, is to be thus prepared; first take out the pins that fasten the frame in the Box, then take the frame out, alwayes observing to put it in again the same way, otherwise it may not fit the Box again; then fasten the sliding shutter on the top to cover the hole close, then dress the Hive and the frame by rubbing them with herbs, as fennell-tops, bean-tops, or elm leaves or any sweet herbs: rub them all about in like manner as Straw-Hives use to be dressed: but of all the wayes to make the Bees best pleased with their Hives, I and others have found that an hogg mulling in an Hive hath been the best way of dressing it, which may be done by throwing in a few handsfull of peas, and let an hogg eat them out, I think I need not direct you to take heed that the hogg break not the glass windows, therefore a trencher or board put before the glasses may be a good way to save them: having dressed the Hive put in the frame again, dress the Box-hive thus: the same day that you have a good swarm to put in it, it will be best done a little before you Hive the Bees: if you dress not your Box-Hive, the Bees will
not

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not so willingly stay therein, because they have been used to Hives of another form, and nature: and for want of thus ordering the Hive, sometimes the Bees will all fly out again. Get as large and as early a swarm as you can, and having your Box-Hive ready prepared as above, shake them into the Box. The swarm being shaken thus into the Box, set it on a sheet with the top uppermost upon the ground, tilting up one side a little; and cover the Box all over from the Sun as well the sides as the top, except only where it is tilted up for the Bees to go in, and if any Bees fly to the place where before they settled then shake them into an empty Straw-Hive, and so bring them to the Box-hive, and knock the Bees all out of the Straw hive upon some part of the sheet just at the place tilted up for them to go into the box-hive, and when they are all in the hive, towards the evening, place the hive into your Bee-house with the mouth of the Box-hive close to the ledg where the hole is cut for their entrance, so that not a Bee can get out; or into the Hive but only through that entrance under the ledg of the front door of the house; and be sure to keep the front doors close shut, especially the next day, and afterwards for a week or two, not so much as to open them to inspect the Colony, unless before Sun rising or after Sun setting. This way to put good early swarms into your house may be as well as a good Stock, provided you be sure to put them into the Bee-house the same night that they are swarmed, or at
left

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lest the very next morning an hour before the Sun riseth, otherwise you will find they will be much worse than a good Stock, and as bad as a midling Stock that would not have swarmed in the old method that year.

The reason why a swarm must be placed so soon into the Bee-house, and the foredoors so shut, is, because the very next morning after they are swarmed, the Bees do little else but learn to know their new habitation and the way to it, which they do thus: A Bee coming out of the Hive into the Sunshine wipes his eyes with his foreleggs, then takes his flight not above three inches from the mouth of the Hive, and there flies three times round; then he flies further off and flies thrice round again; and afterwards a pretty distance off, and fetches a large circumference three or four times, all this while taking notice, first, of the mouth of the Hive he came out, then of the places about it, and at last of the places about the house and garden where the house standeth, after which, he flies straight away directly where his scent leadeth him, to gather what he wants; thus also every particular Bee taketh notice of his Station, when he first cometh abroad, and is newly out of his Cell. Therefore for a mark or sign for the Bees, the better to know when they are at home, and to find their way, it may be convenient, and a good direction for them to paint or colour the Bee-house doors with severall colours
about

about and just over the mouth of each severall Colony, as one red, another blew, or green or yellow, or any distinct Colours. When your swarm is thus put into the house, let it stand so untill the next spring to be rayfed as is herein shewed in the 13th Chapter of this Section.

CHAP. X:

*When to put the first Box-Hive
under the Straw-Hive.*

YOUR Straw-Hive being placed in the house according to the directions given before, let it stand so in the house, untill they have a tendency to swarm, that is, untill the Hive is filled with Bees, which will be according to the forwardness or backwardness of the spring, and the strength and goodness of the Bees themselves, and the fruitfulness of the soil neer them, which will be sometimes in *April*, commonly in the begining of *May*: now, as soon as you perceive the Straw-Hive to be filled with Bees, and not before, is the time when it is fit to be raised, and set upon the first Box-Hive.

The reason why the Straw-Hives must be left so in the house, some time before they are placed upon any Box-Hive is, because the Bees, if not acquainted with their new station, will

will lose themselves, and if they are presently set upon an empty Box-Hive, then that disadvantage is not only the greater by hindering their work, but also they are thereby the more exposed to robbers: for when they are within the Box-Hive they cannot presently know that they are at home, being unacquainted as well there, as without the Hive and house, for when the Bees are well acquainted with their way, and mouth of their Hive on the outside of the house, then if the Straw-Hive should be raised on a Box-Hive, the disadvantage would be so much the less, though they were not full of Bees.

The reason why the Straw-Hives must not be set on the first Box-Hives untill the time that they are filled with Bees, is because till then the Bees are not ready to come down out of the Straw-Hive, and therefore it will hinder their work, for if the Bees are not ready to come down into the Box-Hive with their work as soon as they are placed thereon then they will have double labour to carry their generative matter & Honey through that empty Box-Hive, and not only so, but they will be in danger to be robbed because the Bees will be at so great a distance from the mouth of their Hive, and the robbing Bees will have thereby an opportunity in that vacancy to hide and rest themselves from the pursuit of the true Bees untill they smell somewhat like unto them by their continuance sometime there, whereby they have then an opportunity to steal Honey; all which disadvantages

vantages are easily prevented, by letting the Straw-Hive stand so long as until the Bees fill the Hive to the bottom, and then to set the first Box-Hive under them, as followeth.

CHAP. XI.

How to set the first Box under the Straw-Hive.

WHen your Bees are in such readiness, as fit to be raised, then having the Box Hive ready drest as is shewed in the ninth Chapter of this Section, and observing to draw back the sliding shutter on the top to leave the hole open ; in the dusk of the evening lift up the Straw-Hive and make clean the bottom where the lome or stopping of the Hive hath daubed the floor, then set the Box-Hive down upon the floor with the mouth of it so close to the entrance under the ledge of the fore-door that no Bee may go out on either side, or crawl about it, or into the house, then set the straw-Hive down upon the Box-Hive, and place the old mouth of the straw-Hive over the mouth of the Box-Hive, so that the edges of the combs may stand North and South, and then stop up very close the mouth of the Straw-Hive, and round about the bottom of it, do it so close that not a Bee may any way get out

out of the Straw-Hive but through the hole where the sliding shutter is, into the Box-Hive, and let the Box-Hive stand so close and even to the floor, and to the ledge under the front door, that not a Bee may get out abroad, or about the house, but what goes through that entrance under the ledge which then is, and must at all times be, the only mouth of the Colony for the Bees to pass in and out at. For if you leave any holes or avenues open whereby any Bees can get out and in to either Hive except only their passage under the ledge, it not only causes some Bees to be lost, but also endangers robbing.

CHAP. XII.

How, and when to put under the second Box, whilst the Straw-hive is on.

WHEN the first Box, which is under the Straw-Hive comes to be so far wrought down (in the strength of swarming time) that the combs and Bees fill up two thirds of the Box, then is the Colony to be raised, which state of your Bees will be thus commonly in *June*, but sooner or later according as the year is forward or backward; but when it is thus, which may be seen through the glass windows, then (unless it be late in the year when swarming time is

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pretty well over) proceed to raise up that Box with the Hive upon it, and set under the second Box (the sliding shutter being open) as close to the ledge and floor as you can, and in the very same place exactly, that the other Box stood in before, and set your Colony very even upon that empty Box, and then stop close up that which was their old entrance under the forewindow of the upper-box, which will be open by being raised and set upon another Box : and so cause all the Bees to go out and in to their Colony through the nethermost Box, and so under the ledge of the door, being the old place of their entrance into the Colony. Great care and inspection must be used in the heat of swarming time, to look when the box-Hive is neer full, and this second Box to be set under, because the Bees hatch great numbers of young together, and so will sometimes fill it suddenly and then swarm, unless you put this second Box under before the other is quite filled : and if you put this second Box under too soon, that is, before the Bees breed young in the Box-Hive, then you cause the Bees to have double labour, and so you will thereby lose the benefit of taking off the uppermost Hive that year.

CHAP. XIII.

How, and when to raise a single Box, or put under the second Box, when the Straw-hive is off.

WHEN you have your Colony set up with a swarm in a Box without any Straw-Hive, my direction was to let it stand so until the next Spring; now this having stood all the Winter until the Spring, is in the same manner to be ordered as if a Straw-Hive had been taken off the last year, and afterwards the undermost or nethermost Box also taken away to prevent robbing according to the directions herein after shewed in the 17th Chapter: for then is left only that single Box-Hive which was the middle Hive, in the Summer before, whether a Box Hive or a Straw-Hive had been taken off, as to the ordering the Colony that matters not. Thus you see a Colony, may be in a single Box all the winter though of three sorts; as first, a swarm Hived in a Box-Hive; secondly, the reliet of a good stock when the Straw-Hive is taken off; and thirdly the reliet of a good Colony that hath had several Hives taken off; these three sorts of Colonies being Commonly, *Bonus*, *Melior*, and *Optimus*: for the longer Bees are used to be in Colonies, the more certain they are of thriving; but which sort of Colonies it is of the three, it matters

not as to the ordering of them but only in the time; for if in a single Box they are all to be ordered alike, which is like to the railing of a Straw-Hive as is before shewed in the 10th and 11th Chapters of this Section, to which I refer you : but in short, for the plainer understanding of Country people who keep Bees, it is thus : In the spring when the Bees begin to work apace, towards the beginning of *May* inspect your Bees through the glass windows ; do this now and then, until there be occasion to raise them, to know the time when, let it be as soon as you see the Box within, full with Bees, and if it be a last years swarm when the Box is filled within three inches of the bottom round about the edges of the Hive, for in the middle they will be alwayes near the bottom. When the single Box is thus full with Bees, then lift it up, and set under the second box thus ; place the additionall Box with the sliding shutter open (whether it be quite empty, or if there be Combs in it) just in the very same place exactly as the other stood, especially the entrance, and then set the Colony over it, as even as you can, and presently stop the old place of their entrance which will then be open, I mean the passage under the fore-window of the raised Box, do it so well that no Bees may get out, but only through the additional Box, and so under the ledge of the door of the Bee-house, being the old place of the Bees entring into their Colony.

CHAP. XIV.

How, and when to set under the third Box; which makes a perfect Colony.

IN setting under the third Box-Hive you are to observe the same directions as to the time when, and the manner how, as are before mentioned (and therefore needless here to repeat) in the 12th Chapter of this Section, concerning setting under the second Box when the Straw-Hive is on : for the case is all one as to putting under the third Hive, whether a Straw Hive or a Box-Hive is uppermost ; which is by lifting them up both together, and placing them even upon this third Box with its sliding shutter open, and standing in the very same place, as the second did, before it was so lifted up, and stopping up close the open mouth of the middle Box, which open mouth will then be over the window of the third and lowest box.

CHAP. XV.

How to take off the uppermost Hive, whether it be a Box-hive, or a Straw-hive.

HAVING brought the method thus, to a perfect Colony, with three Hives, whether all three Box-Hives or the uppermost of them a Straw-Hive, although the manner to take them off, and the directions to be observed therein, are all one, and the same, yet the Bees themselves are more unwilling to leave the Straw-Hive than a Box-Hive when it is uppermost, because whilst they have any Straw-Hive (being used to such) they breed in it after their old manner when they lacked room, that is, with a larger circumference about (in proportion) than they do in Box-Hives where they have room enough, and therefore a Colony cannot be said to be well settled untill it hath stood one year after the first uppermost Box Hive is taken off, when also a Straw-Hive hath been taken off before: and then it is past danger of miscarrying if you order them rightly, according to the directions of this Book, and you may take a Box Hive off every year, if it be a good year and your Bees standing but in an indifferent good place; except your ground be overstocked with too great numbers of Colonies.

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I shall now proceed to take them off, in which are to be observed four generall heads, which for more plainness I think best to set down in the form of several Chapters, because they must be all very well considered before the Hive is to be taken off.

The first General Head to be observed before you take off the uppermost Hive.

WHether a Box-Hive or a Straw-Hive to be taken off, consider first the state of the Bees, which is to see that there be sufficient maintenance, and Store of Honey left in the middle Box, for the subsistence of all the Bees, that they may have enough in the spring, and alwayes so much as to spare some (if need were) when Honey-gathering begins again; now to know this, observe, whether the middle Hive be full of Honey or not, which you may see through the glass windows before, or behind; and if the Combs reach to the bottom, so as to fill that middle Box-Hive, and the Combs against either or both windows be stopp'd up white, then you may proceed to take off the uppermost whether it be a Straw-Hive or a Box-Hive, and otherwise not, whatsoever Combs or Bees more or less are in the lower and nethermost Box. However, you may take off a Straw-hive in *June*, before Honey-gathering is past, though you see not the Honey at the windows of the middle Box, if there be any Combs in the nethermost Box, but not after the 10th of *July*.

*The second General Head to be observed before
you tak off the uppermost Hive.*

THE time and season of the year is very warily to be observed and understood because of the King-Bee ; Therefore I advise to take them off at such a time of the year, wherein the time is past in which they are usually disposed to swarm, which in some years is sooner, and in some years later; the most usual time about twenty miles from *London* is in the beginning of *July*, and further off from *London* later in the year ; but for one generall observation, where the harvest is earliest ripe, their the Bees are soonest fitted to have there Hives taken off ; for, we see that the harvest is ripe sooner, neer *London*, than further off, sometimes two or three weeks according to the several distances of the places from *London*. For if you take the upper Hive off in the heat of swarming time, you thereby provoke them to swarm, and if you take the upper Hive off after the King Bees are reduced to one, you thereby endanger the loss of that one King-Bee. And if that one King-Bee by any absurdity committed happen to be lost or killed, then the certain destruction and loss of the whole Colony will unavoidably follow, unless helped to another King from another stock. To avoid which, and for the preservation of the King-Bee, take the upper Hive off before they are reduced to one ; and to know when that is,
take

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take notice when the Bees kill their Drones, for then also do they kill all the superfluous young King-Bees, and sometimes sooner, because all is done by the order of that King which reigns, and this is done before the King retires into his winter quarters, and therefore take off your upper-Hive the first day as neer as you can that you see the Bees do but begin to beat away their Drones, and expell them to the lower parts of the Hive, as you may see them (sometimes) lye, an handfull or two together in an heap upon the floor of the house, or upon the top of the lower Box, which is instead of a floor to the middle Box, then is the time for you to take off your upper-Box, although the Bees as yet do not kill their Drones.

But not to leave you in the dark when I come to describe the manner of taking the Upper-Hive off, then you shall know how to preserve the King Bee, although there is but one left in the Colony, without which it were impossible for this Art to obtain its perfection; for those who keep Bees in divers places cannot be just at the time with them all, especially if they keep many, unless they made it their only business; therefore I shall discover how the Colony may be preserved safe, though the time of the year be so far past that all the King-Bees are reduced to one; yet I conclude that the time above described is the best, because I find it most agreeable to the nature of the Bees.

*The third General head to be observed before
you take off the uppermost Hive.*

BESIDES the time and season of the year, the time of the day also when you take off the Upper-Hive, is to be observed, which I advise to be about three or four a clock in the afternoon; for if it be done in the morning or in the evening when all the Bees are at home, there are then also greater numbers in the upper-Hive as well as in the other, and the fewer Bees are in the upper-Hive, the better it is to be taken off; besides, the Bees that come out of the upper-Hive (except in the day time) may be lost; but the chiefest cause why I advise it to be done about three or four of the clock in the afternoon is, because it is the most convenient time to put the Bees home again to their Colony, when they are taken out of the upper-Hive, especially when there are great numbers, and when it is done so late in the year that there is but one King-Bee left, and he also is in that upper-Hive to be taken off, as it generally falls out when a Straw-Hive is uppermost if it be not done in July, or before.

*The fourth general head to be observed before
you take off the upper-Hive.*

THE fourth head is most material, which is the manner how to take off the upper Hive, which if duely observed, will certainly preserve

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preserve the King-Bee, although there is but one left in all the Colony (if you should happen to stay so long, before you take it off as until all the young King-Bees are slain) which to do you must take notice where he is, and in which Hive of the three he abideth, at that instant wherein you intend to take off the upper-Hive. To know which, take the two directions or observations following, concerning the natures and breed of the Bees. The first direction or observation concerning the natures of the Bees themselves, thus : by natural instinct all King-Bees whatsoever in all Colonies and Straw-Hives, upon any noise or disturbance in, or about the Hive, do ascend upwards, and to as high a place of the Hive as possibly they can, because the crown or top of the Hive is their throne and place of command, and chiefest power; (for if you put two or three King-Bees into a swarm, that same King-Bee which obtains the highest place in the Hive, causes the other to be expelled) this is certain : for as a General upon an alarm repairs to the head quarters of his army, where the Colonels and Captains meet him to know his orders ; so to the King-Bee then in the uppermost part of the Hive, do repair the chiefest force of the Honey-Bees, as it were coming for orders, but at the same time the cowardly Drones sneak into the lower corners of the Hive. And therefore upon this consideration, although the King-Bee is in the middle Box, yet upon the least noise by talking, or or otherwise in your approaching to the Colony, he hastens up into the upper-
Box

Box, and also the strongest Bees with him press up immediately thither also. This I think is caution enough for you to make no noise, so much as by talking or speaking, untill the sliding shutter is driven close home.

The second direction or observation is, concerning the places of their breeding, or in which parts of the Hive the Bees do breed their young, about and among which the King-Bee is alwayes conversant (except in case of alarm and disturbance) which is thus ; the brood of young Bees in the Colonies, when they occupy three Boxes, reacheth from the lower third part of the uppermost, down quite through the middle Box, and a little way into the lowest Box, and that in the lowest Box is more or less according to the richness of the Colony : if very well to pass, then there is the less brood in the upper-Box, and the more in the lowest, but the middle Box is alwayes full, I mean in the middle or central part of the Hive (for their Honey is in the circumference) from the hole at the top where the sliding shutter is, reaching down to the bottom where it meets the hole and shutter in the top of the lowest Box. The length of their young brood is commonly fifteen inches, the thickness five inches, and (being round) the compass or circumference of it is fifteen inches ; it is seldom bigger or lesser, or longer than I have described it : much like to a Tobacco-roll standing upright of that length and bigness, and all the other parts of the Hives round about this breeding place is filled with Honey according to their store.

The

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The Colony being in this condition, and seeing the King-Bee is the only male without whom they cannot breed (as before I have proved) then consequently he must be sometimes in the upper, and sometimes in the lower, but generally in the middle Box where their Brood is most.

Having considered these observations, to know where the King-Bee is, must be by comparing the upper with the lower Box; for if the middle Box be full, and the lower Box hath Combs in it, then observe, as far as the brood of young is supposed to be in the under or nethermost Box, so far below the middle or central part of the uppermost Box-Hive is the uppermost part of the same Brood of young, the Boxes being ten inches high, and still remembring to except the case of disturbance by noise or motion, you may more than probably conjecture, where the King-Bee is: he being generally in or about the middle of that Brood of young all the while any Bees are to be bred. Therefore the upper Hive should be taken off before breeding is past.

In order to take off the upper-Hive, get all your instruments in a readiness: which are, a fit instrument of Wood or Iron to drive the sliding shutter in the top of the middle Box close and home with an hatcheth or hammer. A little Lome or Mortar in case there need any to stop the hole that the Bees may not ascend up out of the middle Box if the shutter be not driven close and home; a knife to cut the Combs away where the shutter is,
if

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if need be, to make it go home; a linnen cloth about two or three foot broad, and about five foot long; a little stick or two about half a yard long, and as big as a broom-stick, and an empty Hive, a Straw-Hive, when you take a Straw Hive off, and a Box Hive when you take a Box-Hive off; having all these in readiness, proceed to take off the upper-Hive in this manner. Without any noise by speaking or bustling, about three or four of the clock in the afternoon approach your Colony at the backdoor of your house, and the first thing you do, with an heavy hammer or hatchet drive close home the shutter that is next under that Hive you intend to take off; do this first to prevent the ascending up of the King-Bee and as soon as this is done which must be very dextrously, then as nimbly as you can lift up the uppermost Hive, and see if the sliding shutter be so close that not a Bee can get up out of the middle Box, and if the Combs hinder, cut them away with your knife, and if not yet close enough, stop it with Lome or mortar, then set the uppermost Hive on as it was before, only tilted up a little, about an inch or two with a stick, or any thing, and let it stand thus about an hour; all this time not opening the foredoor at all; and whilst you are at your work, take care that you move not the lowest Box from the ledge under the front-door, lest the Bees get into the house that way; then shut the back-doors to make it dark in the Bee-House for that hour, in which time you may guess whether the

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the King-Bee is in the upper-Hive which you took off, or in the middle Hive, being the uppermost of those two you left unmoved in their places. For, if the King-Bee is in the upper-Hive thus separated, the Bees in that Hive will be quiet without any murmuring noise; but if the King-Bee is not in the upper-Hive so separated, then the Bees will murmur, and many of them will be creeping away: so if the King-Bee is in the middle Hive, being the uppermost of those two left still in their places, then the Bees in those two Hives will be quiet, and follow their work, and make no discontented murmuring noise; and consequently if he be not in the middle Hive, the Bees there will be very unquiet, and discontented.

The reason why I direct to leave the house dark for an hour, is because the Bees in the uppermost-Hive being thus displaced and disturbed, will seek for their King, and whether they find him or not, being in the dark, they will fill themselves with their own Honey, and in that time they will be the better prepared to leave their Hive afterwards. When the hour is expired, then your next work is to take the uppermost Hive quite off, and carry it away to get out the Bees that are therein; for there will be some, more or less, according to your dexterity in doing your work in shutting the shutter close; but many or few, the way to get them out is thus.

CHAP.

CHAP. XVI.

*How to gett the Bees out of the uppermost
Hive taken off, and how to put them
to their Colony again.*

HAVING an empty Hive ready, as before directed, carry your Hive taken off the Colony four or five yards distance from the Bee-house, to take the Bees out of it there, rather than close to the Bee-house, lest you disturb the other Bees: place your Box-Hive on a joynt-stool with the leggs upwards, and place the Box-Hive thereon with the top downwards, and if it be a Straw-Hive place it in a bucket or pail with the top downwards, let either of them stand, or be held fast, and so set turned up that you may see all the combs, then having the full-Hive so placed, whelm or cover it hollow over with your prepared empty-Hive so that all the Bees may creep up thereinto, then make or cause the Bees to ascend up into the upper-Hive thus: strike only the under-Hive which was taken off the Colony with the stick before spoken of to be ready, beating that Hive lightly; for, with the little shaking of the blows, and constant noise of knocking, which must be done by going round as a Cooper when he driveth an hoop on a tub; and if it be a box-Hive knock it in like manner sometimes underneath, the better to drive the Bees up, then within one hour or thereabouts if you still keep beating the Hive, the Bees will all ascend

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ascend up into the upper empty Hive by degrees crawling up, and in their ascending you will hear their humming noise greater or lesser according to their numbers, and all, except perhaps a few Drones, and here and there a stragling Bee, will be ascended up into the empty Hive: but if there be any crevise whereby any Bees can creep out betwixt the Hives, then stop them close in by tying the linnen cloth (before directed to be gotten ready) close round about, for if any Bees can creep out any where whilst you knock the under Hive with your stick, then the rest will not easily ascend, which cloth will seldom be wanted for this use when the Straw-Hive is gone, because the Box-Hives are even, and so the Bees cannot creep out betwixt them, but at the mouths of them which must then be stopped. But observe in your driving up the Bees in this manner that you neither shake nor strike the upper empty Hive, but only the under full Hive, which was taken off the Colony, for in so doing you will cause the Bees already ascended to fall down again, and so cause your self double labour.

Having thus gotten the Bees into the upper empty Hive, although it should so happen that through negligence or want of time you have tarried untill so late a time of the year as until all the King Bees are reduced to but one and that one King-Bee should also be in the uppermost Hive when taken off the Colony, yet will he be gone up into this empty upper-Hive with the other Bees, being driven on this manner.

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When the Bees are thus in the empty Hive, then take off the linnen cloth tyed round the Hives, and so take them from off their full Box or Hive, and immediately send your Honey within doors for your use, that other Bees by the smell of it may not be brought to it, and as quickly as you can spread the linnen cloth before the mouth of the Colony from whence you took the Hive off, and with two nails fasten one end of the cloth smoothly before and on both sides of the Bees alighting place before the Bee-House, and so close, that the Bees may creep off the cloth into their own Colony at the mouth, and let the cloth hang down smooth and sloping to, and upon the ground its whole length from the mouth of the colony, still remembering all the time from the beginning of your work, not to open the fore doors of the Bee-House, but keep them close shut. Then at once with a smart blow on the outside of the Hive knock all the Bees out of the empty Hive upon the cloth where it is sloping, and if all the Bees are not clean knocked out of the Hive, then give it a violent knock by striking the edges of the Hive upon the cloth where it lyes on firm ground to get the Bees clean out upon the cloth, then you will see that all the Bees will croud up like sheep into a fold, and without taking wing, creep up to the mouth of their own Colony, and so in unto their fellows rejoicing that they are at home, and the King-Bee also if he be among them, for this is the only time of seeing the King-Bee; therefore do it in the day time, and not late

in

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in the evening, for then also the Bees that get loose may find their way to their own home. And if this be done as I have directed so that all the Bees may be at home being gone up off the cloth into the Colony, and the cloth taken away, about two hours before Sun setting, then you may certainly know whether the King-Bee is among them or not if you did not see him upon the cloth (as sometimes you may) among the other Bees; for in one quarter of an hour after the Bees are all at home, if the King-Bee is with them, then the Bees will be still and quiet, and keep in their Colony without running up and down about the mouth or murmuring noise; but on the contrary, if the King Bee is not among them; then the Bees will run to and fro about the mouth of the Colony as if they were distracted, and in the Colony they will have a constant murmuring noise; and many of them will fly abroad and about in search for him, which if they then do, you may be sure their King is not among them.

Then if it be so, look well into the Hive taken off and carryed within doors, perhaps he may be there, as sometimes he is; if it be a straw-Hive taken off, and an old stock when your Colony was first furnished with him: but I never found it so when I took off a Box-Hive, and very seldome when I took off a Straw-Hive, and then I observed that the Combs in such Straw-Hives were very old, but when it is so, for remedy take your Combs out of the Hive carefully by degrees though you break them, and lay them out in
I 2 pans;

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pans, and neer the top or crown of the Straw-Hive you may find the King-Bee among the Combs, then take him, and carry him to his Colony putting him in at the mouth, and in two minutes you will see a wonderfull change in the actions of the Bees, changing their mournings to rejoycings, the consequence of which will be, that the Bees will chearfully follow their labours as before you took their Honey away.

Thus you have your uppermost Hive with Hony taken safely off your Colony without the destruction or killing of the Bees themselves, who will labour to requite your pity to them in sparing their lives by working the more vigorously for you the next Summer in order to spare you some more of the fruits of their labours in way of thankfulness in the like manner, if the unkindness of the year do not hinder their earnest industry: for those Bees whose lives are spared having passed the accidental and personal miscarriages of the Summer past, and passing the winter in rest, will vigorously, and early in the spring begin their working again.

But here I give you to know that by my own experience and others, when the uppermost Hive is a Box-Hive, then the King-Bee is more certainly in the middle-Box, and therefore the Bees are more willing to part with, and go out of a Box Hive when taken off than a Straw-Hive. The King-Bee also when they are rid of the Straw-Hive and reduced only to the way of Colonies, is preserved with less trouble, and more certainty, especially if

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if you take them at the time and season before directed; for as one among five or six is more probable to escape when danger comes than one alone is, and it being alwayes safer to prevent than overcome dangers (*Venienti occurite morbo*, that is, meet a disease coming) so it is best not to delay too long, although you have a remedy, and know how to preserve your Colony.

Having reduced your Colony in the house to two Hives only, by the taking off the uppermost, observe afterwards for two or three days whether the Bees work or not, for if they carry in generative matter, you may be sure that the King-Bee is in safety, for without him they cannot breed, and without him they will not work.

Also if they kill their Drones after the upper-Hive is taken off you may be sure their King is safe, because they kill their Drones by his orders, for if he be not among them to give those orders they kill them not. But if you should by observing find that your Colony works not, nor kills their Drones, and so doubt their King to be lost, then you may furnish your Colony with a King-Bee from some poor stock or cast to be taken up, which time is then coming on, and neer: and if thus you put to them a King-Bee when yet their own King-Bee is safe, then that King so put to them will be expelled by the Bees, otherwise they will receive him for their King.

CHAP XVII.

*How to order the Colony after the upper
Hive is taken off: or if you take
not the upper Hive off.*

WHen your Colony is reduced to two Boxes, or Box Hives only (the Straw-Hive being once gone, is never after to be used again) then proceed to order them as followeth, at the beginning or towards the middle of *August* according as the year is good or bad for robbing, and forward or backward: inspect your Colony, and observe what numbers of Bees are in the lowest Box, and whether they continue therein or not, for as the weather grows colder and colder, the Bees will ascend upwards into the upper-Hive of the Colony and lie closer and closer together, and as soon as you find by looking in at the windows that almost all the Bees are gone up out of the under Box, so as to lodge in the upper Box, then although that under Box be half full with Combs, or whether there be any Combs in it or not, yet if there be almost no Bees in it (besides a few that watch) in the evenings and in the mornings, then take it away from under the Colony and set the upper Box on the floor again, and in taking the Colony off the under Box, if the Combs that were in the passage break so that they hang down lower than the other parts of the Combs in the Colony (as sometimes they do) then cut them off even with a knife because they should not be bruised and bended when the Box

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Box stands on the floor, and after those Combs are cut off even with the rest, set the Colony down on the floor in the single Box, withal remember to open their mouth that they may have breath and passage out and in under and through the ledge of the house door, to which ledge they must be set close. But if any store of Bees besides those that watch do still remain in the under Box, in the cold mornings and evenings, then let it stand under until the Bees are almost all gone up, unless you suspect robbers: for if robbers should trouble the Colony, then he must be set down the sooner in his single Box.

For, the setting the Colony thus low with a single Box is not only a sure defence against the cold and robbers; but also in the Spring following they will the sooner fill that single Box with Bees, and be the sooner ready to be raised again according to my directions before given in the 13th. Chapter of this Section.

That lower Box which you take from under your Colony, you may reserve clean, and dry all the winter with the Combs in it, to set the same again under your Colony in the Spring when you raise him again, you may also let all the Combs abide in it, if they are sweet and clean, and free from Spiders, and webs, except the Drone-Combs, which I advise you to cut quite away with a knife. You may know the Drone-Combs which are seldom above two, by the bigness of the Comb and the largeness and depth of the Cells, from the other Cells of the Hony-Bees Combs.

When you have three Boxes one over and

ther, or if the uppermost Hive of your Colony is a Straw-Hive, and there is not sufficient maintenance in the middle Box, so that you are not to take off the uppermost that year, as I mentioned in the first general head in the 15th. Chapter of this fourth Section, then in such case remember to take away the nethermost Box-Hive in like manner as above and so leave the two uppermost Hives all the Winter, as you do the single Box-Hive in the Bee-House when the uppermost is taken off.

CHAP. XVII.

How the Colonies may Swarm.

HAVING ordered your Colonies thus ; either left all the winter in a single Box, or with two Hives, you have your choice when spring comes whether you will have an increase by swarming or not, for if you intend in the Spring to have your Colonies swarm, then forbear to raise them up by putting under a second Box, then you need not doubt of a swarm ; but after the second Box is set under them perhaps they will swarm by your forbearing to put a third Box under them, and if so then you have your end answered ; but that year in which you let your Colony swarm you must not expect to take off the uppermost Hive, and when you intend to have no swarm then raise the Colony according to the formentioned directions, and then you will have your profit by taking Honey.

Many.

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Many Colonies according to the year, and place they stand in will be so strong as not to spare their nethermost Box in the fall, after their uppermost is taken off according to the time and manner before directed, then let such a Colony stand to swarm.

When the Colony is reduced to Boxes only, so that you have your Colony occupying three Boxes in the Summer and yet have not (as sometimes it will fall out in some places) sufficient maintenance for the Bees in the middle Box, so that no Box is to be taken off, which happens commonly in very bad years, then having taken away the nethermost Box in the fall, as is directed in the foregoing Chapter, let such a Colony thus with two Boxes stand the next Summer to swarm, for then you will have a large swarm, fit to furnish a Colony withall, and perhaps to be raised upon another Box the same year.

CHAP. XIX.

Concerning the robbing of Bees: and how to prevent it.

Many persons are of such a bad disposition, as to speak evill of those things whereof they are ignorant as appears by a false, jealous, and envious report which many who keep Bees only in Straw-Hives have raised in some Countries, which report is this, That where Bees are kept in Colonies no other Bees near them will thrive, because say they,

they, Bees kept in Colonies will rob and spoil all other Bees that are kept neer them, and that they will and do, so rob and spoil them, is, because they are necessitated to do it for their livelihood; their Honey being taken away, and the Bees not killed.

To answer these jealous-headed persons, if reason would satisfy them; the Bees in Colonies are so far from being necessitated to rob or steal from others by reason of want, that they have commonly left in them, after the upper-Hive is taken off, more Honey than a strong stock kept in a Straw-Hive hath, though he hath not swarmed; Therefore let such know, that when the Honey is taken from the Colony, the upper-Box only is taken from them, and at the same time there is such store of Honey left in the two lower Boxes as is sufficient to maintain all the Bees; for if there were not Honey enough left for their maintenance and to spare, then either the Colony would dye, or become poor thereby, so that their owner would have the greatest loss, however they could not be in want until robbing time were past.

But it is rather their own poor stocks, and poor swarms, kept in Straw-Hives that are in the greatest likelihood of robbing and stealing out of necessity; for they are forced to take and kill such although they have but a few spoonfulls of Honey in them, or else they leave such to rob and steal, or be Starved in the Winter. What else can be the reason, that there is the greatest robbing among Bees in very bad years for Honey-

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gathering? but because all stocks and swarms are generally so poor that scarce any, stocks or swarms can live untill the next summer, except only those stocks which have not swarmed in the Summer preceding, as it happens in many places after some wet Summers; (for I have known an aged skillfull Bee-master that had 60 stalls, and swarms of Bees, in such a year take up 20 of them, only for to have their Honey to feed the other 40 withall) insomuch that Bees in many places being sensible of their own poverty, have been led into Brew-houses by the sweet smell of the wort, where many Bees have Drowned themselves; for I have known in several Country Towns where Bees have been kept, some persons (whom I could name if need were) that have been brewing in the beginning of *August*, have been forced to strain their wort from the Bees drowned therein. And in such years there is generally the greatest robbing among the Bees.

All Bees whatsoever (I mean Honey Bees) whether kept in Straw-Hives, or in Colonies, are of such natures (for the keeping of Bees in Colonies doth not change their natures) as to be sensible of their present poor state, as well as of the succeeding Winter, and they have such knowledg as to be capable of despair in such cases, and then if Honey is not to be had abroad for gathering, they will get it any way, if it be to be had in any place, by right or by wrong, to maintain themselves in the Winter; which makes them, if the weather will permit, go abroad to pilfer from, and rob other Bees; and

and therefore in the fall chiefly each stock or Kingdom of Bees is so providentially carefull of their own wel-fare, that they keep good watch and ward at home, according to their several abilities, and kill every strange Bee that they can catch.

For as soon as the Summer is so far spent, that Honey-gathering is past, then comes the time of robbing among the Bees, and then those Bees disposed to rob others, fly from one stock to another, and from one Colony to another, attempting to get in and steal Honey, though in danger of their lives thereby; and thus some Bees do every year, more or less, according to the goodness or badness of the year for plentifulness of Honey; for in very bad years they rob one another very much, but in good years they rob very little, so that scarce any Bees have been robbed, when the year hath yeilded much Honey; which shews that Bees knowing their poverty and lack of food, and also their strength, which consists in great numbers (for if they have but few Bees, they are not so able to fight, as to overcome and rob another stock) do grow desperate; otherwise they would not so much endanger their own lives as wee see they do, in attempting to rob others, when they find that they have not a competent maintenance at home. Also all that keep Bees know, that in good years there are very few or no robberies committed among their Bees: The cause of which I judge to be, because the Bees know when they have sufficient to maintain them until the next Summer, and then they are
not

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not so desperate as to endanger the loss of their own lives, to get more with so much difficulty, danger, and injustice,

From which premisses I conclude, that rich stocks and Colonies well ordered, and well to pass, seldom, or never, rob others; but those only that are strong in Bees, having great numbers, and little food, or scarce enough to maintain them, do grow desperate from the sense of it, and so make it their work to go about to steal and rob from others: and those stocks or Colonies that have few Bees, are in most danger of being robbed. For the robbing Bees will go abroad whilst warm weather permits, and going from one stock to another, and from one Colony to another, will endeavour in very small parties to get in and pilfer, and where they find easy entrance, and small resistance, and can but carry away at three or four times, only so many bellies full of stolen Honey, then they will be sure to come again and bring more of their fellows; and then if they get in, though but a fourth number of them escape to return home again laden with Honey to their fellows, yet they are sure to return again & come with forces greater and greater until they overcome the Stock or Colony, out of which at first only two or three Bees had escaped with a little stolen Honey: and when they are overcome the true Bees will help the robbers to carry away their own Honey to their Hives: according to *Virgil Georg. lib. 4.*

—————*Constructaque mella*

Diripere ipsa: et crates solvere favorem.

To

To prevent all kinds of robbing among your Bees take notice of the times of the year for robbing, as followeth.

All the Summer whilst honey is plenty, and to be had abroad for gathering, then the Bees are just and honest, and will not rob others, so that if the next Colony or Hive were full of Honey, and no Bees in it, they would not go to take it, unless they were shewed the way, or some Bees should find it to be so by chance by going into the Hive through a mistake, or the Combs broken so as to make the Honey in them smell stronger than usual.

In the Winter the Bees are so soon chilled with cold, that they cannot go abroad, therefore robbing times are only Spring and Fall.

In the Spring Bees are not so strong as in the Fall, therefore robbing is most, and more strongly carried on in the Fall, than in the Spring: besides, most of those Stocks which would have robbed others in the fall, are themselves dead and starved for want of food before the Spring is so far come on as to rob.

Take notice also that a *vacuum* or empty space between the body of the Bees and the mouth of the Hive in robbing time, is a great temptation to the robbers as it were inviting them to come by the advantage they have of hiding themselves for some space of time in that *vacuum*, and by abiding there they begin to smell like the true Bees, whereby they avoid the pursuit of, and are not so soon found out by the true Bees; thus the robbers have the greater opportunity to pilfer; and when
once

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once a few robbing Bees have gotten their booty, viz. A belly full of Hony and escape to their own Hives with it, then that Colony or Stock out of which the robbers did but pilfer, is in very great danger of being robbed.

To prevent this kind of robbing, I have ordered the lower Box of the Colony to be taken away, in the manner described before in the 17th. Chapter of this Section.

Another cause of robbing is when there be divers passages out and into the Colony or Hive, or if any Bees can get out and in under the Box or Hive by reason of the unevenness of the floor, or through any other place besides the common single mouth; these passages much endanger robbing, because the robbing Bees and Spies by them get access into the Hive or Colony unespied by those that watch.

To prevent this kind of robbing I have in my directions in divers places ordered all avenues and holes about the Hive or Colony where a Bee can get out or in, to be alwaies close stopped up, except only their mouth passage.

Another great cause of robbing is a large entrance into the Colony at the mouth in robbing time, which is a great disadvantage to the Colony, and so also to a Stock, because then is required the greater numbers of Bees to defend it, whereby the Colony Bees are wearied and tired out with much watching; also you may observe that the robbing Bees will be sooner abroad in the morning about their evill intentions then commonly other Bees

Bees go abroad at that time of the year, and coming to a Colony or *Hive* so early in a morning, they easily get by the guard, if the passage be not so narrow that a centinel might guard it.

You may know robbing time when it begins by the approaching of several *Bees* that attempt to go into a Colony or *Hive* of *Bees*, but dare not, flying, and hovering about the mouth of it, and making many offers to get in, untill for their boldness, some are caught by the *Bees* of the Colony, and suffer Death for it, and others by the example of their fellows sufferings fly away to the next *Hive* or Colony to try their fortunes there also, where if they meet with a strong guard they retire, and come no more. Thus in some years almost every Stock and Colony is tried by the robbing *Bees*.

To prevent this and all other kinds of robberies as well as other absurdities in ordering your *Bees*, besides what hath been already hinted, the last and chiefest help to prevent robbing is duely to keep the door or passage of your *Bees* shut or stopt up, all the year according to the season; for the causes why so many Stocks of *Bees*, and Colonies are robbed in bad years, next to the poverty and strength of the robbing *Bees* is, the neglect of stopping them up soon enough in the fall, according as I have known many who would not stop up their *Bees* (because they thought the *Bees* did still gather Honey) thereby to prevent the coming of robbers to them, untill they saw their *Bees* infested with the robbers

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robbers: which was much like to him that shut the Stable door, as soon as the horse was stolen out; for when once the Bees are much troubled with the robbers: if thy die not, nor are robbed, yet they are much weakned by them.

The best way therefore is to stop them up thus: as soon as hony gathering is past (which is sooner or later according to the year) which any man may know by the Bees beginning to beat their Drones away, & by the Bees leaving to work apace, then although in *July*, yet narrow their passage to half an inch or an inch according to the strength of your Bees: and in the begining of *August* narrow their passage to half an inch square, and let it stand so untill the cold weather, and then make it somewhat less according to the strength of your Bees: for the Bees must alwaies have some air, then leave them so all the winter, and in *February* open the passage again to halfe an inch square till *March* is almost out, and then, or sooner if the year be forward and your Bees strong, make their passage an inch in length, and so let it stand untill the end of *April*, or thereabouts, and then according to the strength of your Bees you may make their passage wider and wider to its full length, that the Bees worke might not be hindred, and as soon as swarming time is fully past narrow their passage a little, untill Honey gathering is fully past, and the Bees begin to leave working apace again then make their passage an inch again, and so on, to half and inch, &c.

Observe in generall that some years are

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much

much more forward than others, and in some places the spring is two or three weeks forwarder than it is in other places; therefore some discretion must be used as to the time certain when to stop up, and open the passages of your Bees, for we see that spring and harvest are generally sooner near *London* than further off.

But if you perceive your Colonies or Straw-Hives, at any time infested, and visited by the robbers, with greater numbers than three or four, or with more than the true Bees can very well conquer and punish, your only way is, immediately to stop their passage up close with pieces of Tobacco-pipes, or with a Comb, or any thing through which the Bees may have air, and not be smothered: and at night; after Sun-setting, open the passage again, and so let out all the Bees that will go out; for no Bees but robbers will then fly away: and when the Bees are still and quiet within, and the robbers all gone, which will be in a quarter of an hour, then stop them up close again, as before, so that not a Bee can get out nor in, and keep it so close stopt for three daies, and afterwards open it a little only at noon, to give the Bees liberty for about four hours only in a day, because of their danger; and when one Hive or Colony is so stopt up, look well to the next Hive or Colony that stands by him, to stop him up closer than ordinary, or quite close in like manner: for the robbers will vigorously assault all those stocks or Colonies which stand near to such as they are prevented to rob.

CHAP. XX.

Of the diseases of Bees, and their remedies.

THE only disease which I yet know incident to Bees (which I can properly term a disease) is a lask or flux, which we may see by their evacuating their excrement thinner than usual, with which the Bees grow weak, and soon dye, which happens most in warm winter weather, and early in the spring, when they fly abroad ; the cause of which is, because they can have no vegetables whereof they can gather physical food to help themselves. The remedy of this disease is to give the Bees some salt and Honey mixed with meal and water, or salt and Honey mixed alone, and so let the Bees eat thereof, it will help them ; and these things also will prevent the disease, being given before.

But there are several other occasions of their ruin, as fighting, cold and hunger, want of air, and the loss of their King-Bee, besides various accidents happening to single Bees abroad at their works, by winds and rain, by which they are often beaten down, and then soon chilled and killed, especially in bad weather in the Spring, and are often met with by their enemies, as Birds on the Trees, and Poultry, &c. The best remedies of these occasions of ruine to the Bees, I shall here lay down in order.

Their fighting is prevented by the House

Fig 2

right

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right made, as in *Chap.* the 2d. of this *Section*, and by keeping the doors duely shut as in *Chap.* the 5th. of this *Section*, and by having their passage kept duely stopt up, according to the directions in the foregoing *Chap.* concerning robbing.

Their cold and hunger is prevented, by keeping the house close, and by putting a little Straw on them in the very cold weather, and by leaving them food sufficient, according to the directions in the 15th. *Chap.* of this *Section*, and feeding them, if you have not left them food enough; for having great numbers of Bees, and it proving bad weather in the Spring, they may soon come to want, and for remedy when it is thus, draw back the sliding shutter on the top, and put in some Honey mixed with a little Salt, and you will then wonder to see what great encouragement the Bees will receive thereby, and how briskly they will work after it, and if good weather succeeds, want no more; I shall speak something more of their cold and hunger in the next *Chapter*.

Their want of aire in the Hive, besides the danger of smothering them, occasions the Combs where there is any moisture to grow mouldy, and breed vermin, unless just where their globulous body is, & consequently makes them loathsome to the Bees, as well in Summer as in Winter; the remedy of which is to give them some aire at all times according to the season.

Concerning the loss of their King-Bee I have sufficiently treated in the 2d. Chapter of the 2d. Sect.

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2d. Section, the remedy of which is to supply them with another; but to prevent his loss observe the directions in the 15th. and 19th. Chapters of this section.

Those various accidents that befall single Bees, can no wayes by art be remedied, therefore your best course is to preserve your Colonies with as great numbers of Bees as is possible, for then the whole Colony will be the better able to bear those particular losses.

The Bees in Colonies are better preserved from several of their enemies than they can be in Straw-Hives, as from mice, birds, moths, &c: from mice thus: whereas mice breed under the hackle, and gnaw an hole sometimes into an Hive of Bees, they cannot eate, through a wooden Box Hive, nor so easily enter in at the mouth, though not stopped at all, as they sometimes do into the Straw-Hives though stopped, if the lome be not very well mixed, or covered with ashes: From birds thus, whereas divers sorts of birds as sparrows, titmice, and others, do often come to the mouth of a straw-Hive, and peck at it, whereby they cause the Bees to come out in cold weather and so eat them one by one as they come forth: Those birds cannot come to the Box Hive to peck at it, when the house doors are duly kept shut, and though they peck at the door, yet the Bees within the Hive by reason of the distance are not (at that time of the year) disturbed, and consequently are not enticed out by that noise the birds make in pecking.

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Moths generally harbour and are bred in hackles, of which there is no occasion in this method of Colonies, and though sometimes a sort of Maggots or Wormes which turn to Moths, are bred among the Combs in some weak Stocks, yet I never knew any in a strong Stock or Colony.

And Spiders, Emmets, Snails, and other Vermin which usually annoy the Bees in Straw-Hives, are by the house, and Box-Hives well ordered, in this method much better kept off from being any trouble or annoyance to the Bees.

Any man that keeps Bees, and considers this method of ordering the Bees in Colonies, may reap some advantage, in knowing the better how to order them in Straw-Hives, untill such time as he can attain to get an house and Box-Hives (right made) and Colonies; for the Bees natures are not changed, but their industry is much improved in this method of Colonies; as I shall now shew.

CHAP. XXI.

*Of the Profit of Bees kept in Colonies,
beyond what Profit can be reaped,
from Bees kept only in Straw-
Hives.*

WHosoever with diligence shall observe and follow the directions in this Book, he will find that he shall rarely miss his desired end both of delight and profit.

Delight ; in seeing their curious works, and great industry, and in observing their admirable natures &c.

Profit ; by the well thriving of his Bees, as many who have already taken my directions, have since experienced in having their expectations answered without the loss of their Bees, and are willing to testify the same if need were.

As to the profit of Bees kept in Colonies I shall speak the less, because I can prove it in fact (as I have done in divers places already) therefore I shall only let you know that being kept in Colonies and well ordered (for without ordering them right you must not expect it) Bees do and will yield more than double the profit (when settled Colonies) than they are able to do, when kept in Straw Hives ; for besides the justice of the thing, to save those creatures alive (who spend their whole life in earnest endeavours for the good of their kee-

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pers by that mercy shewed to the Bees themselves) their preservation only, more than balances the peradventure of a swarm the next Summer, because the Colony left is so much better than a Stock of Bees.

And passing over that small advantage which is betwixt the constant attendance which Straw Hives require in having one to watch when they will Swarm almost all the Summer, and the small attendance that Colonies require, being now and then to look upon them.

The benefit of keeping them in Colonies if ordered right, according as I have directed in this Book, will shew its self in the certainty of their preservation against two of the chiefest and most considerable occasions of the destruction of Bees, *v.z.* cold and hunger, for whereas being kept in Straw-Hives they are subject to cold for want of numbers to keep them warm in Winter; and hunger for want of food to maintain them whereby they become desperate, and turn robbers, and if they fail of robbing others, are starved themselves; now in this method of Colonies, they are wholly delivered from these two occasions of their ruine, from cold; because the Bees are all left, and so have their full numbers, whereby they keep one another the warmer in cold weather, and in the Spring; what else can be the reason that the Bees in *Russia, Poland, New-England* &c. (where the weather is so extream cold in Winter) do live and thrive better than in *England*? but because they are in greater numbers, and lying in a round
form

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form and close body, keep out the cold from them, and the cause why they increase more and faster (in the spring and Summer in those Countries than in *England* (and consequently thrive better) is because both spring and Summer in those places are more serene and constant than with us.

From hunger; because they have food sufficient left them, and to spare, in the middle Box; if the owners themselves will but duely observe the directions in the 15th. Chapter of this section.

Besides what I have mentioned, the profit appears to be more than double both by reason and experience, thus : As three cords united by twilting together in one, are stronger than each cord alone is, and as three or four sticks bound close together are not so soon broken as each single stick alone is; so in a Colony the strength of a stock, a swarm and a cast are united together, whereby the Colony hath the strength of all; which strength consists in numbers, and being united they have more then a double advantage in working and gathering Honey, for whereas the strength of a stock is divided by sparing a swarm, their interests (by their interest I mean their growing strength by the Brood of young, as well as riches and present strength) doe thereby become different and separate, whilst the Colony Bees being undivided in their interests losing no time, doe follow and improve that their advantage by natural industry. which advantage of Colonies hath appeared to be treble in Honey-Dews by this example

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example following, which I can bring testimony of, to any that desire it, by those who saw it, upon the 21. day of *June* 1677, a Colony was weighed whose weight was just 55 pounds, and the same Colony was weighed againe upon the 28. day of the same *June*, and then the weight of the Colony was 85 pounds, so that in those seven dayes the Colony gathered 30. pounds of Honey, which wee saw by the white plaistering upon the Combs at all the windows, and in the same space of time a stock or swarm seldom can add above five or six pounds weight to themselves.

The reason of which great advantage to the Colony is their being united, because at such a time the Colony having but one Brood of young-Bees, can spare all to work except their Drones which then keep their young Brood warm; but the stock and swarm having each of them a young Brood at home when the harvest of Honey-Dews come, they being separate, cannot spare half so many labourers in proportion as the Colony can and doth.

A stock cannot spare his proportion because most go away with the swarm, and the swarm though he hath a competent strength, yet many times hath not Combs in readines to put their Honey in, and when he hath some Combs. they are presently so filled with the young Brood (which must be kept in a constant heat by the Bees) that they also cannot spare a proportion in number comparable to the Colony.

Moreover in bad weather the Colony Bees are not forced to go abroad as oftentimes swarms

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swarms are through want of Combs, &c. which I have known to that degree in wet weather, that a swarm hath lost above half the number of his Bees.

Further, to shew that the profit of keeping Bees in Colonies is more than double the profit, of keeping them in Straw-Hives, only I shall now demonstrate by comparison, thus: If the Honey taken from a Colony in one year be more in quantity than the Honey taken from a stock and a swarm: and if the Colony left be as good and better than the Box taken off; then I doubt not but any man will grant with me the profit to be more than double, because there is as much or more left then taken, and as much taken as a stock and swarm can make: for they being killed, there is an end of their profit, which profit is more than countervalued by the Box taken off the Colony: but the Colony left yields so much every year, and that is much better than the present profit; therefore the Colony left is better than the Box taken off.

That the Colony Box taken off contains more in quantity than the Honey taken from a stock and a swarm, is thus computed. If a Box taken off a Colony weighs 56 pounds (as the least of all I ever yet took off weighed so much) and the weight of a stock be 28 pounds (most of them weighing much less) and the weight of a swarm be 28. pounds which is rarely exceeded (for a stock that hath not swarmed seldom exceeds 40 pounds) these compared are equal: the Colony Box being the same in weight, as are both

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both stock and swarm, some may think that the fine Honey in a swarm may be better than the Colony Honey : but when they come to compute the dross, they will find that the Colony exceeds at least a fourth or fifth part thus : the stock and swarm both weighing 56 pound, and the Colony Box weighing the same weight ; there will be of good Honey at least one fifth part more, produced out of the Box than out of both the Straw-Hives, by reason of dross : for, the stock and the swarm have two Broods of young ; but the Colony hath but one, which also is (the greater part of it in the middle Box, so that that part of the Colonies Brood of young which is in the Box taken off is not so large, as is the least of the Broods of young either in the stock or swarm : besides, there is more virgin Honey in one Colony than in three Straw-Hives (though two of them swarms) because the Colony having room enough doth not put his honey into those Cells, where they use to breed young as the Bees are forced to do in all Straw-Hives for lack of room, and so their Honey is courser.

Moreover if the swarm be left standing to balance the worth of the Colony left (which by much odds it cannot do) then the stock taken up will weigh much less than half the weight of the Colony taken off, besides the goodness of the Honey in the Colony above that in the Straw-Hive.

But to satisfy all persons that a Box-Hive taken off a Colony is so much as I have mentioned will appear by that which I presented

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to his Majesty in *White-Hall* upon the 28th. of *August* 1677, which weighed above 64 pounds, and almost all was Honey, because the Bees with their Brood of young; were gone down into the lower Boxes, so that there was more in quantity of Honey from that Box than three very good stocks that have swarmed will yield when the Bees are killed: that Colony with divers others in the same Bee-House being in very good case every year to yield the same profit, as I have by experience found, having since that time *viz.* The last year, taken off my Honey again, and expect to do the same again at the end of this Summer, and so onwards every year.

And therefore; to evince the continual profit of Colonies, I intend every year to keep one or more of my Box-Hives which I yearly take off my Colonies the space of seven or eight weeks (for much longer it will not keep good, because of the young grubs in it) to be seen by any that will take but so much pains as to come to my house (as is mentioned page 73. of this Book) in the Bowling-alley at *Westminster*.

I have this year already taken off my Colonies, and have reserved two to be seen as above: the one weighing 61 pound, the other above 57 pound. Therefore if any man shall take other methods of ordering their Colonies, and neglect this: if they miscarry, let them not be so injurious as to blame the Art.

Whatsoever persons of Quality or Gentlemen

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men desire to see the delightful working of the Bees in the Colonies, and to set them up: for their further encouragement and instruction (besides the furnishing them with Box-Hives right made, and licences, and the example of some Bee-Houses as I mentioned in the advertisement in the beginning of this Book) I shall be ready whilst I live to impart unto them, any experiences, or needful directions from time to time when they send to me, or I come to their houses, though 50 or 60 Miles from *London*, if they desire it, to direct them in setting up, and ordering their Colonies in this way of improving Bees, and taking their Honey without killing them.

To conclude, Whatsoever Gentlemen, or Bee-Master, who shall peruse this history of Bees, and shall yet remain doubtfull (or be of another Judgment besides, or contrary to what I have herein asserted) concerning any thing herein contained, or any thing else concerning the natures of Bees, or the practices of Bees whether kept in the old method of Straw-hives, or in this new & more excellent method of Colonies (being more excellent, not only because more just, and more mercifull, but also because it is a more delightful and more profitable method of keeping Bees) or concerning any other projects about them; I shall be ready and willing at any time to resolve and satisfy them, and to communicate any other of my experiments concerning Bees unto them if they have recourse to me by letters, or otherwise, at my dwelling
men-

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mentioned in the preface. But because no man can be perfect: and there is no art yet so perfectly known to any of the Sons of men, but may admit of further improvements; therefore I account not my self infallible in this, yet shall but hope for further and better improvements of Bees: I shall therefore conclude with the words mentioned in the Title:

----*Si quid novisti rectius istis
Candidus imperti: si non, his utere mecum.*

If any man, knows any thing, more true than
I impart,
Let him disclose it; otherwise, improve with
me this Art.

F I N I S.
